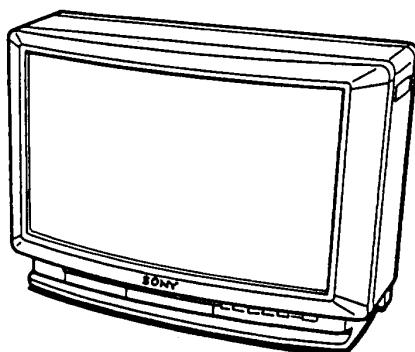
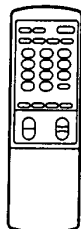


KV-W28MH2/W28MN21 KV-W32MH2/W32MN21/W32MX2

RM-890

SERVICE MANUAL



GE Model

KV-W28MN21 Chassis No. SCC-J45B-A
KV-W32MN21 Chassis No. SCC-J45A-A

HK Model

KV-W28MH2 Chassis No. SCC-J47B-A
KV-W32MH2 Chassis No. SCC-J47A-A

WB Model

KV-W32MX2 Chassis No. SCC-J46A-A

JE Model

KV-W28MH2 Chassis No. SCC-J52A-A

AG-1 CHASSIS

MODEL OF THE SAME SERIES

KV-W28MH2/W28MN21	
KV-W32MH2/W32MN21	
KV-W32MX2	

SPECIFICATIONS

Power requirements

110-240 V AC, 50/60 Hz

Power consumption

250 W

Television system

B/G, I, D/K, M

Color system

PAL, PAL 60, SECAM, NTSC4.43,
NTSC3.58

Stereo system

NICAM Stereo B/G, I; A2 (German)
stereo B/G

Channel coverage

See "Channel coverage" at the bottom.

Antenna

75-ohm external antenna terminal for
VHF/UHF

Audio output (speaker)

15 W x 2

Number of terminal

Video Input: 4, Output: 1

Audio Input: 4, Output: 1

S1 Video/S Video

Input: 4, Output: 1

Y: 1 Vp-p, 75 ohms, unbalanced, sync
negative,

C: 0.286 Vp-p, 75 ohms

— continued on next page —



TRINITRON® COLOR TV
SONY®

KV-W28MH2/W28MN21
KV-W32MH2/W32MN21/W32MX2
RM-890

Picture tube	HD Trinitron
Tube size (measured diagonally)	
	KV-W28: 28 inches
	KV-W32: 32 inches
Screen size (measured diagonally)	
	KV-W28: 66 cm
	KV-W32: 76 cm
Dimensions (w/h/d)	
	KV-W28: 750 × 520 × 528 mm
	KV-W32: 905 × 600 × 584 mm
Mass	
	KV-W28: 49.5 kg
	KV-W32: 73 kg
Accessories	
Supplied	Remote commander (1) Size R6 (AA) battery (1)
Optional	KV-W28: TV stand SU-W28 KV-W32: TV stand SU-W32

Design and specifications are subject to change without notice.

Channel coverage

M E/ASIA/CATV W EURO

Receivable channel	Channel display
E-2 to E-12	C02 to C12
E-21 to E-69	C21 to C69
S-01 to S-03	S42 to S44
S-1 to S-41	S01 to S41
Indonesia	
1A	C01
2 to 11	C03 to C12
Morocco	
M-4 to M-7	C70 to C73
M-8 to M-10	C08 to C10
New Zealand	
1	C01
2 to 11	C03 to C12
21 to 69	C21 to C69

AUSTRALIA

Receivable channel	Channel display
Australia	
AS-0 to AS-12	C00 to C12
AS-5A, AS-9A	C13, C14
AS-28 to AS-69	C28 to C69
New Zealand	
1	C00
2 to 3	C01 to C02
4 to 7	C06 to C09
8	C14
9 to 11	C10 to C12

HK/UK

Receivable channel	Channel display
Hong Kong, United Kingdom	
B-21 to B-68	C21 to C68
Ireland	
A to J	C01 to C09
South Africa	
4 to 13	C04 to C13
21 to 68	C21 to C68

CHINA/E EURO

Receivable channel	Channel display
China	
C-1 to C-2	C01 to C02
C-3	C13
C-4	C03
C-5	C04
C-6	C14
C-7 to C-12	C06 to C11
C-13 to C-24	C21 to C32
C-25 to C-47	C38 to C60
C-48 to C-57	C61 to C70
Z-1 to Z-39	S01 to S39
Eastern Europe	
R-1 to R-12	C01 to C12
R-21 to R-60	C21 to C60

AMERICA/CATV AMERICA

Receivable channel	Channel display
2 to 79	C02 to C79
A-1	S99
A-2	S98
A-3	S97
A-4	S96
A-5	S95
A-6	S06
A-7	S05
A-8	S01
A to W	S14 to S36
AA to CCC	S37 to S65

JAPAN

Receivable channel	Channel display
J-1 to J-62	C01 to C62
C-13 to C-32	C80 to C99

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CAUTION

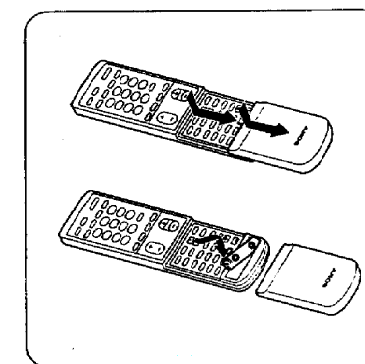
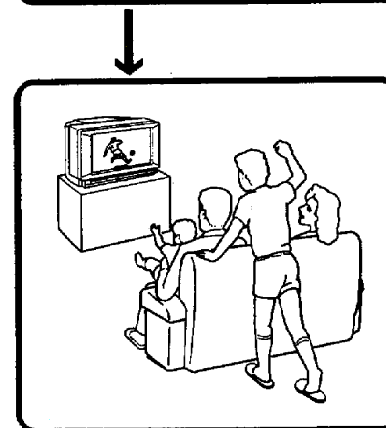
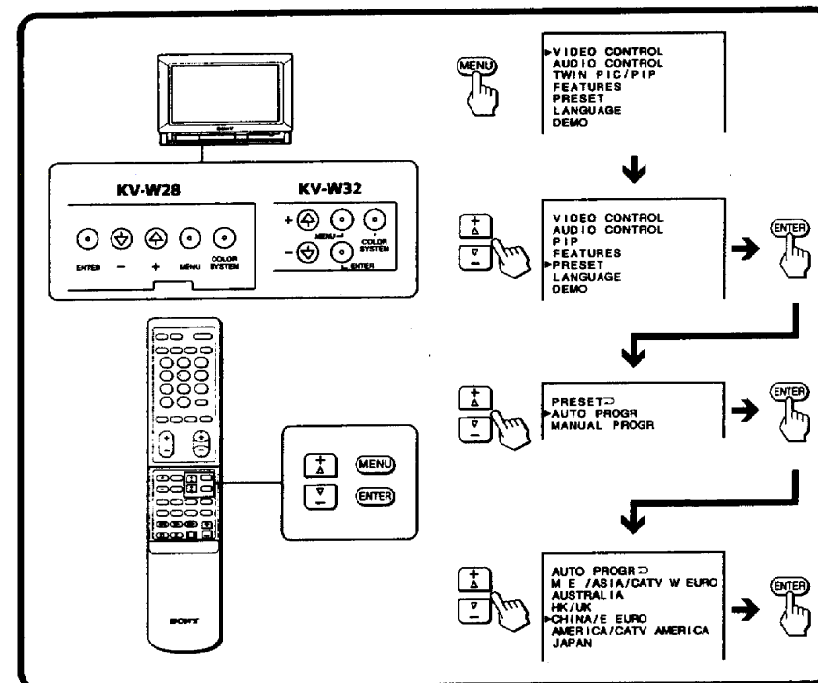
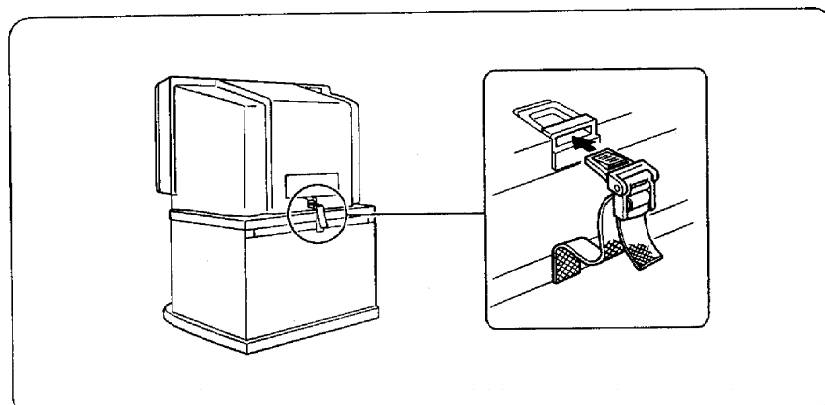
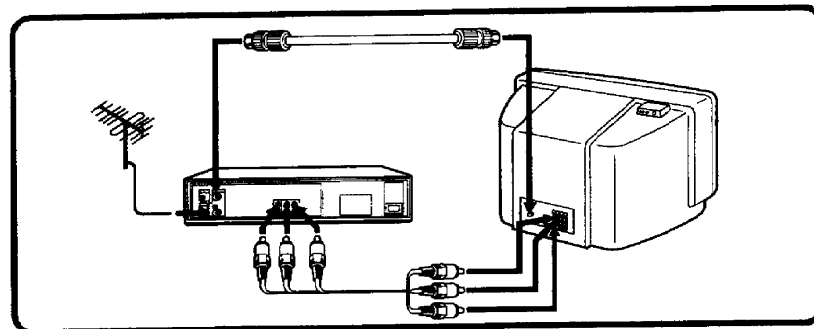
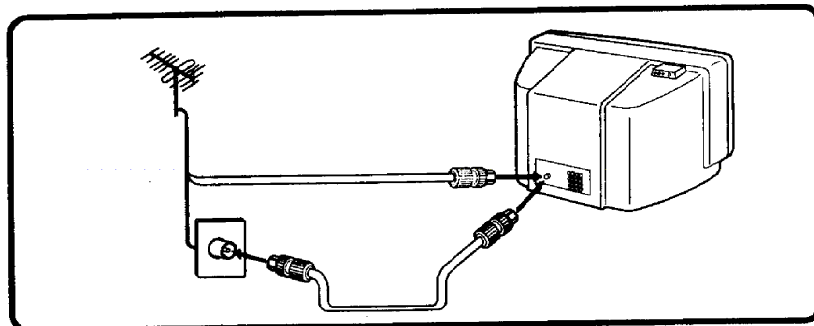
SHORT CIRCUIT THE ANODE OF THE PICTURE TUBE AND THE ANODE CAP TO THE METAL CHASSIS, CRT SHIELD, OR CARBON PAINTED ON THE CRT, AFTER REMOVING THE ANODE.

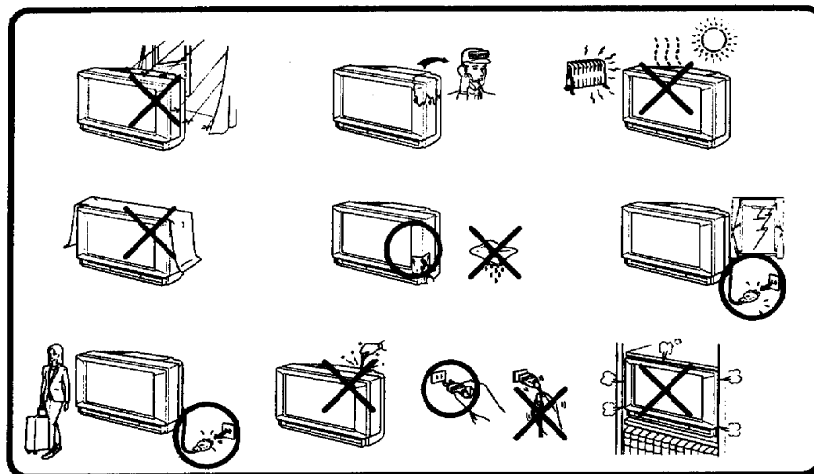
SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY SHADING AND MARK Δ ON THE SCHEMATIC DIAGRAMS, EXPLODED VIEWS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY.

SECTION 1 GENERAL

The operating instructions mentioned here are partial abstracts from the Operating Instruction Manual. The page numbers of the Operating Instruction Manual remain as in the manual.





WARNING

To prevent fire or shock hazard, do not expose the TV to rain or moisture. Dangerously high voltages are present inside the TV. Do not open the cabinet. Refer servicing to qualified personnel only.

For general safety:

- Do not expose the TV to rain or moisture.
- Do not open the rear cover.

For safe installation:

- Do not block the ventilation openings.
- Do not install the TV in hot, humid or excessively dusty places.
- Do not install the TV where it may be exposed to mechanical vibrations.

For safe operations:

- Do not operate the TV on anything but 110-240 V AC.
- Do not operate the TV if any liquid or solid object falls in it—have it checked immediately.
- Do not keep the TV plugged in if you are not going to use it for several days.
- Do not pull the power cord to disconnect the TV. Pull it out by the plug.

Caution

Avoid touching the screen surface and take care not to scratch it with hard objects.

Note

The picture color may become abnormal if you change the direction of your TV. To obtain the normal picture color, press **POWER** on the TV to switch off the TV for five minutes and then switch it on again.

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Getting Started

- 6 Introducing the menu
- 7 Changing the menu language
- 8 Presetting channels

Operations

- 9 Watching the TV
- 10 Watching the picture in wide mode
- 12 Watching two programs at one time-TWIN PICTURE and PIP
- 14 Selecting the picture mode
- 16 Selecting the sound mode
- 17 Selecting a stereo or bilingual program
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- 24 Connections
- 25 Troubleshooting
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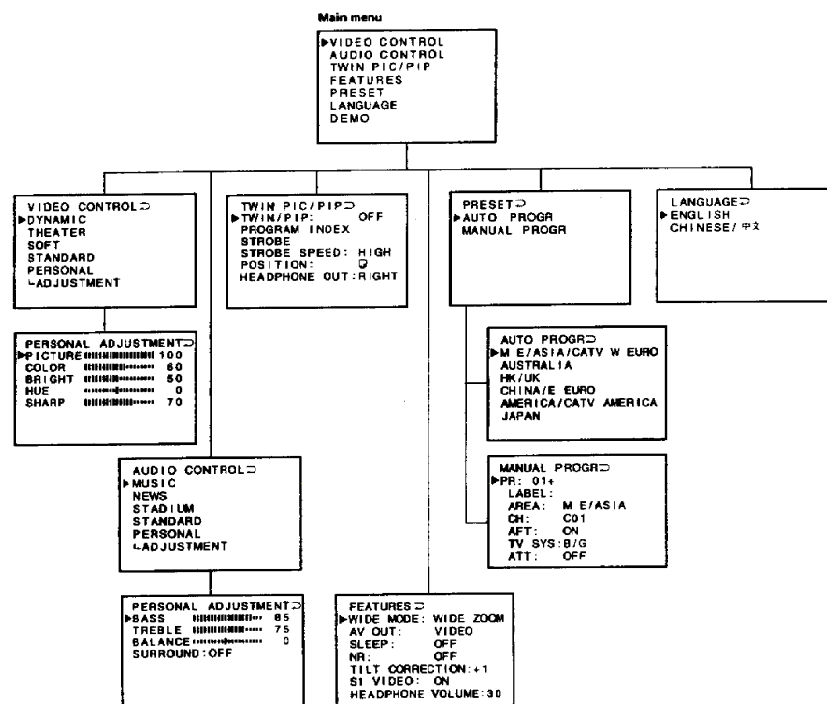
Note on the remote commander

- The supplied remote commander is used on several models of the TV. If you do not find instructions for some controls that are on the remote commander, that means your TV does not employ the features of those controls, e.g. TEXT.

All contents are subject to change without notice.

Introducing the menu

You can preset channels and set the wide mode, picture quality, sound, and other settings using the on-screen menus. You can use the buttons on both remote commander and the TV to operate the menus.



Getting back to the previous menu

Press Δ + or ∇ - to move the cursor ($\blacktriangleright$) to the first line ($\square$) of each menu (except for the main menu), and press ENTER.

Cancelling the menu screen

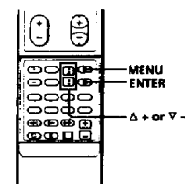
Press MENU.

Notes

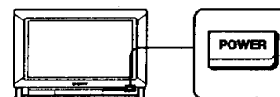
- If more than 60 seconds elapse after you press a button, the menu screen disappears automatically.
- DEMO in the main menu briefly introduces the main features available for the TV. Press any button on the remote commander to stop this function.

Changing the menu language

If you prefer Chinese to English, you can change the menu language. You can use the buttons on both the remote commander and the TV.



1 Press POWER on the TV.



2 Press MENU.



VIDEO CONTROL
AUDIO CONTROL
TWIN PIC/PIP
FEATURES
PRESET
LANGUAGE
DEMO

3 Press Δ + or ∇ - to move the cursor ($\blacktriangleright$) to LANGUAGE.



VIDEO CONTROL
AUDIO CONTROL
TWIN PIC/PIP
FEATURES
PRESET
LANGUAGE
DEMO

4 Press ENTER.



LANGUAGE
ENGLISH
CHINESE/中文

5 Press Δ + or ∇ - to select CHINESE.



LANGUAGE
ENGLISH
CHINESE/中文

6 Press ENTER.



语言/LANGUAGE
英文/ENGLISH
中文

7 Press MENU to return to the normal screen.



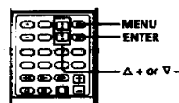
Presetting channels

You can preset TV channels easily by storing all the receivable channels automatically. You can also preset channels manually or skip program positions (pages 21 and 22).

You can preset channels using the buttons on the TV as well as those on the remote commander.

Presetting channels automatically

You can preset up to 100 TV channels in numerical sequence from program position 1.



1 Press MENU.



VIDEO CONTROL
AUDIO CONTROL
TWIN PICTURE
FEATURES
PRESET
LANGUAGE
DEMO

2 Press Δ+ or ∇- to move the cursor (▸) to PRESET.



VIDEO CONTROL
AUDIO CONTROL
TWIN PICTURE
FEATURES
▸ PRESET
LANGUAGE
DEMO

3 Press ENTER.



PRESET ▸
▸ AUTO PROGR
MANUAL PROGR

4 Press Δ+ or ∇- to select AUTO PROGR.



PRESET ▸
▸ AUTO PROGR
MANUAL PROGR

5 Press ENTER.



AUTO PROGR ▸
▸ M E/ASIA/CATV W EURO
AUSTRALIA
HK/UK
CHINA/E EURO
AMERICA/CATV AMERICA
JAPAN

6 Press Δ+ or ∇- to select your area (channel system).

For the areas allocated in each channel system, see "Channel allocation" on page 26.



AUTO PROGR ▸
▸ M E/ASIA/CATV W EURO
AUSTRALIA
HK/UK
▸ CHINA/E EURO
AMERICA/CATV AMERICA
JAPAN

7 Press ENTER.

Presetting starts from program 1.



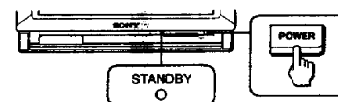
1 2 3 ... 1

Watching the TV

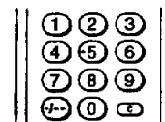
1 Select the TV program you want to watch.

Press the number buttons or PROGR +/- . The TV turns on automatically and the selected program appears.

When the STANDBY indicator on the front of the TV is not lit, press POWER on the TV, and select the program position.

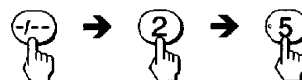


To select a program position directly
Press the number buttons.



To select a two-digit program position, press "1" before the number buttons.

For example, to select program position 25, press "1" and then "2" and "5."



To scan through program positions

Press PROGR +/- until the program position you want appears.



To select a channel directly

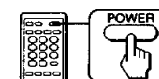
Press C (once for VHF/UHF channels, twice for cable TV channels), then press the number buttons (two-digit number for VHF/UHF channels, three-digit number for cable TV channels). For example, to select the VHF/UHF channel 4, press C, 0 then 4.

2 Press VOL +/- to adjust the volume.



Switching off the TV

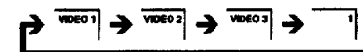
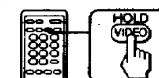
To switch off the TV temporarily, press POWER on the remote commander.
The STANDBY indicator lights.



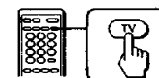
To switch off the TV completely, press POWER on the TV.

Watching the video input

Press VIDEO/HOLD.

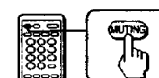


To watch TV, press TV, the number buttons or PROGR +/-.



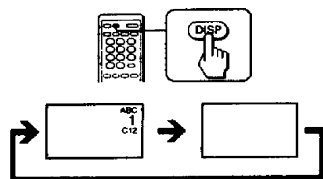
Muting the sound

Press MUTE.



Displaying on-screen information

Press **DISP**.



Note

- When you press **DISP**, the on-screen display shows the picture, sound and wide mode settings as well, all of which disappear after three seconds.

Freezing the Picture

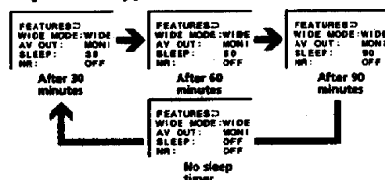
Press **FREEZE**.

The screen will become **TWIN PICTURE**, and the frozen picture will appear on the right screen.

Setting the Sleep Timer

You can set the TV to turn off automatically after the period of time you set.

- Press **MENU**.
- Press **Δ** or **∇** – to move the cursor (►) to **FEATURES**, and press **ENTER**.
- Press **Δ** or **∇** – to move the cursor (►) to **SLEEP**, and press **ENTER**.
- Press **Δ** or **∇** – until the time (in minutes) you want appears.



- Press **ENTER**.

To cancel the Sleep Timer, select **OFF**, or turn the TV off.

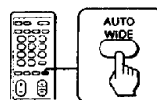
Watching the picture in wide mode

You can enjoy a variety of wide-mode pictures. The TV's **WIDE MODE** factory preset is **WIDE ZOOM**. You can also manually set the **WIDE MODE** in the **FEATURES** menu.

Using the **AUTO WIDE** function

When you set the TV picture mode on **AUTO WIDE**, the TV will automatically choose the wide picture mode (**WIDE ZOOM**/**ZOOM**/**SUBTITLE**) that is most suitable for the program you are watching.

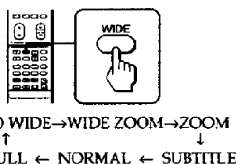
Press **AUTO WIDE**.



Using the **WIDE** function

You can preview all wide-mode pictures and set the desired mode by pressing the **WIDE** button on your remote commander.

Press **WIDE** until the mode you want appears on the screen.



WIDE ZOOM

This mode is ideal when viewing a movie or sports programs.

Conventional Picture (NORMAL mode)



WIDE ZOOM



ZOOM

This mode is best for viewing a movie with black bands or subtitles.

Conventional Picture (NORMAL mode)



ZOOM



SUBTITLE

This mode is most suitable when watching movies with subtitles.

Conventional Picture (NORMAL mode)



SUBTITLE



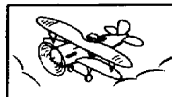
Viewing a picture in **FULL** mode

When you are watching a video game screen with dynamic effect or watching an **S1 Video** picture, use **FULL** mode.

Conventional Picture (NORMAL mode)



FULL



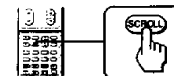
Note on **AUTO WIDE**

- Depending on the picture sources, the **AUTO WIDE** function may not stick in one mode. It may differ. In this case, select your desired wide mode using the **WIDE** button.
- The **AUTO WIDE** function is not available for **SECAM** color system.

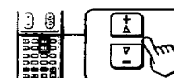
Scrolling the picture up or down

If subtitles are lost in subtitle mode, you can scroll the picture up or down to view them. The picture scrolls up or down within the range of **-5** to **+5**. You can also use the scroll function in widezoom and zoom modes. Using the scroll function in widezoom mode changes the vertical size of the picture.

- Press **SCROLL**.



- Press **Δ** or **∇** – to adjust the position of the picture.



Note

- If you display the **PIP** screen in zoom mode or scroll the picture with the **PIP** screen in zoom mode or subtitle mode, the **PIP** screen may be lost. However, this does not indicate a malfunction.

Selecting the desired **WIDE MODE** from the menu

When **AUTO WIDE** is set, the TV automatically picks the best mode. You can use the **FEATURES** menu to select another mode.

- Press **MENU**.

► VIDEO CONTROL
AUDIO CONTROL
TWIN PICTURE
FEATURES
PRESET
LANGUAGE
DEMO

- Press **Δ** or **∇** – to move the cursor (►) to **FEATURES**, and press **ENTER**.

FEATURES
► WIDE MODE: WIDE ZOOM
AV OUT: VIDEO
SLEEP: OFF
NR: OFF
TILT CORRECTION: +1
S1 VIDEO: ON
HEADPHONE VOLUME: 30

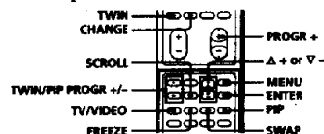
- Press **Δ** or **∇** – to move the cursor (►) to **WIDE MODE**, and press **ENTER**.

- Press **Δ** or **∇** – to select the desired mode, and press **ENTER**.

To see the different wide picture modes, refer to page 10 and 11.

Watching two programs at one time-TWIN PICTURE and PIP

You can display left and right TWIN PICTURE screens or display a Picture-in-Picture (PIP) sub screen within the main picture.



Displaying TWIN PICTURE

You can display two screen pictures side by side by using the TWIN/PIP menu and/or the TWIN button on the remote commander.

Press TWIN.



Selecting a TV program or video input in the right TWIN PICTURE screen

To select a TV program, press TWIN/PIP PROGR +/- button.

To select a video input, press TV/VIDEO.

Notes

- You cannot select the same channel on the right and left screens.
- When playing video games, use the right screen to obtain better picture.

Displaying PIP

You can display PIP by using the TWIN/PIP menu and/or the PIP button on the remote commander.

Press PIP.



Main picture Subscreen

Selecting a TV program or video input in the PIP screen

To select a TV program, press TWIN/PIP PROGR +/- button.

To select a video input, press TV/VIDEO.

Freezing TWIN PICTURE and the PIP screen

Press FREEZE.

The PIP sub screen or right TWIN PICTURE screen will freeze.

To restore the normal picture, press FREEZE again.

Changing the left and right TWIN PICTURE screens

Press CHANGE.



Swapping pictures between the main and PIP screens

Press SWAP.



Swapping the sound between TWIN PICTURE's right and left screens or PIP's main and sub screens

Press AUDIO SWAP.

The "P" display will appear indicating which TWIN PICTURE's sound is being received.

Changing the position of the PIP screen

1 Press MENU.

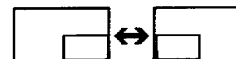
VIDEO CONTROL
AUDIO CONTROL
TWIN PIC/PIP
FEATURES
PRESET
LANGUAGE
DEMO

2 Press Delta +/- to move the cursor (P) to TWIN PIC/PIP, and press ENTER.

TWIN PIC/PIP
P-TWIN/PIP: OFF
PROGRAM INDEX
STROBE
STROBE SPEED: HIGH
POSITION: 0
HEADPHONE OUT: RIGHT

3 Press Delta +/- to move the cursor (P) to POSITION, and press ENTER.

4 Press Delta +/- to select the position you want.



Selecting TWIN PICTURE or PIP from the menu

Follow these directions to select PIP and TWIN PICTURE from the TWIN PIC/PIP menu.

1 Press MENU.

2 Press Delta +/- to move the cursor (P) to TWIN PIC/PIP, and press ENTER.

3 Press Delta +/- to move the cursor (P) to TWIN/PIP, and press ENTER.

4 Press Delta +/- to select TWIN 1, TWIN 2, PIP 1 or PIP 2 and press ENTER.

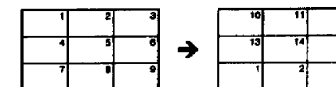
To view a sample of the TWIN PICTURE and PIP screens, see "Displaying TWIN PICTURE" and "Displaying PIP" sections.

Checking all the preset programs (Program Index)

Press INDEX.

The nine preset programs appear sequentially in the separated screens, switching the picture each second, and followed by the next 9 preset programs. After all preset programs are displayed, the sound of each program will be output at 5 second intervals.

Pressing PROGR + also switches to the next nine programs.



If you press INDEX while watching TWIN PICTURE, the right screen will scan the programs in the Program Index. The TV will stop scanning programs when it returns to the original channel where it started.

To restore the normal picture

Press the number buttons which you want to watch (e.g., for program 25, press +/-, 2 and 5). Pressing INDEX also restores the normal picture.

Notes

- You can also display nine sequential TV programs using the menu. Select PROGRAM INDEX from the PIP menu, then press ENTER.
- If you display different TV systems in the Program Index screen, the size of the separated screens may be different.
- You cannot use TWIN PICTURE while PROGRAM INDEX is selected.

Displaying frame-by-frame pictures (Strobe)

- 1 Press MENU.
- 2 Press Δ + or ∇ - to move the cursor ($\blacktriangleright$) to TWIN PIC/PIP, and press ENTER.
- 3 Press Δ + or ∇ - to move the cursor ($\blacktriangleright$) to STROBE, and press ENTER.



To select the strobe speed

Select STROBE SPEED from the TWIN PIC/PIP menu, and press ENTER. Then select HIGH (3 seconds), MIDDLE (7 seconds) or LOW (12 seconds) with Δ + or ∇ -, and press ENTER.

To restore the normal picture

Select STROBE from the TWIN PIC/PIP menu again, and press ENTER.

You can also restore the normal picture with TV, VIDEO, PROGR +/-, POWER or Wide mode buttons.

Notes

- You can hear the normal sound when using the strobe feature.
- You cannot watch TWIN PICTURE when STROBE is selected.

Notes on TWIN PICTURE features

- If you display different color systems in the right and left screens, the size of screen may be different.
- The sound from the right screen is monaural.

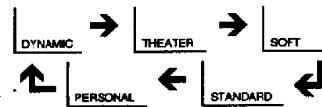
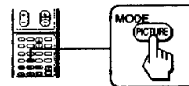
Notes on PIP features

- When you display a VCR picture in the PIP screen at a speed other than normal speed, the picture may be noisy depending on the VCR. The picture can be improved by selecting the smaller size of the PIP screen.
- If you display different color systems in the main screen and the PIP screen, the size of the PIP screen may be different and the PIP picture may be noisy. This is not caused by the malfunction of the TV.

Selecting the picture mode

You can select the picture mode using the menu as well as the PICTURE MODE button on the remote commander. Select VIDEO CONTROL from the main menu, then select the desired mode.

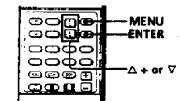
Press PICTURE MODE until the mode you want appears on the screen.



Select	To
DYNAMIC	Display more contrast picture
THEATER	Display darker and finely detailed picture suitable for movies
SOFT	Display softer picture suitable for video games or for viewing in a dark room
STANDARD	Display normal contrast picture
PERSONAL	Display the picture that is adjusted using ADJUSTMENT in the VIDEO CONTROL menu

Adjusting the picture setting (ADJUSTMENT)

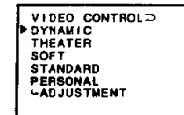
You can adjust the picture quality to suit your taste with the ADJUSTMENT option. The adjusted settings are stored in the PERSONAL option.



- 1 Press MENU.



- 2 Press Δ + or ∇ - to move the cursor ($\blacktriangleright$) to VIDEO CONTROL, and press ENTER.



- 3 Press Δ + or ∇ - to move the cursor ($\blacktriangleright$) to ADJUSTMENT, and press ENTER.



- 4 Press Δ + or ∇ - to move the cursor ($\blacktriangleright$) to the item you want to adjust, and press ENTER.

- 5 Press Δ + or ∇ - to adjust the item, and press ENTER.

Item	Press Δ + to	Press ∇ - to
PICTURE	Increase picture contrast	Decrease picture contrast
COLOR	Increase color intensity	Decrease color intensity
BRIGHT	Brighten the picture	Darken the picture
HUE	Make skin tones become greenish	Make skin tones become reddish
SHARP	Sharpen the picture	Soften the picture

- 6 To adjust other items, repeat steps 4 and 5.

- 7 Press MENU to return to the normal screen.

Note

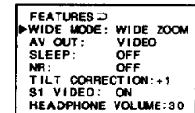
- You can adjust HUE for NTSC color system only.

Reducing the noise of the picture (NR)

You can reduce the noise level of the picture when the TV receives a weak signal or when you play a video tape that is in poor condition.

- 1 Press MENU.

- 2 Press Δ + or ∇ - to select FEATURES, and press ENTER.



- 3 Press Δ + or ∇ - to select NR, and press ENTER.

- 4 Press Δ + or ∇ - to select ON, and press ENTER.

To turn the noise reduction off, select OFF and press ENTER.

If the color of the picture is abnormal when receiving programs through the T (antenna) terminal

Press COLOR SYSTEM on the TV or change the TV system setting from the menu as described below until the color becomes normal.

- 1 Press MENU.
- 2 Press Δ + or ∇ - to move the cursor ($\blacktriangleright$) to PRESET, and press ENTER.
- 3 Press Δ + or ∇ - to move the cursor ($\blacktriangleright$) to MANUAL PROGR, and press ENTER.
- 4 Press Δ + or ∇ - to move the cursor ($\blacktriangleright$) to TV SYS, and press ENTER.
- 5 Press Δ + or ∇ - to change the TV system until the color becomes normal.

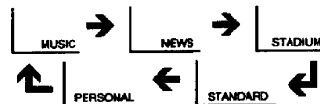
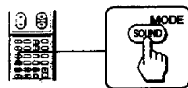
Note

- Normally set COLOR SYSTEM to AUTO.

Selecting the sound mode

You can select the sound mode using the menu as well as the SOUND MODE button on the remote commander. Select AUDIO CONTROL from the main menu, then select the desired mode.

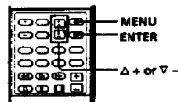
Press **SOUND MODE** until the mode you want appears on the screen.



Select	To
MUSIC	Listen to music programs. It gives sound with a live concert effect.
NEWS	Listen to news program. A person's voice can be heard clearly.
STADIUM	Listen to sports program. It gives sound with a sports stadium effect.
STANDARD	Listen to sound other than music, news or sports program.
PERSONAL	Listen to the sound that is adjusted using ADJUSTMENT in the AUDIO CONTROL menu.

Adjusting the sound setting (ADJUSTMENT)

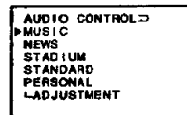
You can adjust the sound quality to suit your taste with the ADJUSTMENT option. The adjusted settings are stored in the PERSONAL option.



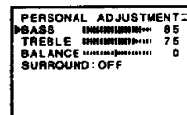
1 Press **MENU**.



2 Press **Δ + or ∇ -** to move the cursor (▶) to **AUDIO CONTROL**, and press **ENTER**.



3 Press **Δ + or ∇ -** to move the cursor (▶) to **ADJUSTMENT**, and press **ENTER**.



4 Press **Δ + or ∇ -** to move the cursor (▶) to the item you want to adjust, and press **ENTER**.

5 Press **Δ + or ∇ -** to adjust the item, and press **ENTER**.

Item	Press Δ + to	Press ∇ - to
BASS	Increase the bass sound	Decrease the bass sound
TREBLE	Increase the treble sound	Decrease the treble sound
BALANCE	Increase the volume of right speaker	Increase the volume of left speaker

6 To adjust other items, repeat steps 4 and 5.

7 Press **MENU** to return to the normal screen.

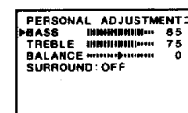
Listening to surround sound

You can enjoy a surround sound effect that is like being in a movie theater or a concert hall when receiving stereo signals.

1 Press **MENU**.

2 Press **Δ + or ∇ -** to move the cursor (▶) to **AUDIO CONTROL**, and press **ENTER**.

3 Press **Δ + or ∇ -** to move the cursor (▶) to **ADJUSTMENT**, and press **ENTER**.



4 Press **Δ + or ∇ -** to move the cursor (▶) to **SURROUND**, and press **ENTER**.

5 Press **Δ + or ∇ -** to select **ON**, and press **ENTER**.

If the sound is distorted or noisy when receiving programs through the T (antenna) terminal

Change the TV system setting as follows until the sound becomes clear.

1 Press **MENU**.

2 Press **Δ + or ∇ -** to move the cursor (▶) to **PRESET**, and press **ENTER**.

3 Press **Δ + or ∇ -** to move the cursor (▶) to **MANUAL PROGR**, and press **ENTER**.

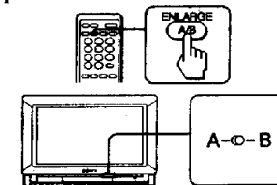
4 Press **Δ + or ∇ -** to move the cursor (▶) to **TV SYS**, and press **ENTER**.

5 Press **Δ + or ∇ -** to change the TV system until the sound becomes clear.

Selecting a stereo or bilingual program

You can enjoy stereo sound or bilingual program of NICAM and A2 (German) stereo systems. The initial setting is stereo sound.

Press **A/B/ENLARGE** repeatedly until you receive the sound you want. The sound changes and the corresponding indicator lights up as follows:



When receiving a NICAM program:

Broadcasting	On-screen Display	Selected sound (Indicator lit)
NICAM stereo	NICAM	→ Stereo → Regular (A and B)
NICAM bilingual	NICAM	→ A → B → Regular (A) (B)
NICAM monaural	NICAM	→ NICAM monaural (A) Regular

When receiving an A2 (German) stereo program:

Broadcasting	On-screen display	Selected sound (Indicator lit)
A2 (German) stereo	STEREO	→ Stereo → Monaural (A and B)
A2 (German) bilingual	—	→ A → B (A) (B)

Receiving area for NICAM and A2 (German) stereo programs

System	Receiving area
NICAM	Hong Kong, Singapore, New Zealand, etc.
A2 (German) stereo	Australia, Malaysia, Thailand, etc.

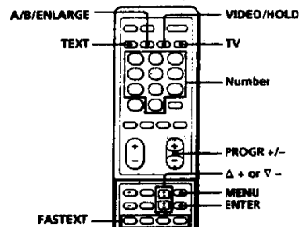
Notes

- If the signal is very weak, the sound becomes monaural.
- If the stereo sound is noisy, select "regular" or "mono." The sound becomes monaural, however, the noise will be reduced.

Viewing Teletext

■ KV-W28MN21/W32MN21 only

TV stations broadcast an information service called Teletext via a local TV channel. Teletext service allows you to receive various information such as weather forecasts or news at any time. Some of the features, however, may not be available depending on the Teletext service.



Displaying Teletext

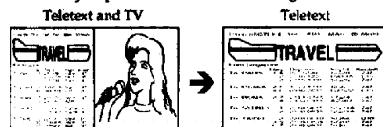
- 1 Select a TV channel which carries the Teletext broadcast you want to watch.
- 2 Press **TEXT** to display the Teletext.
A Teletext page (normally the index page) is displayed on the left TWIN PICTURE, and the TV screen is displayed on the right TWIN PICTURE. If there is no Teletext broadcast, "No text available!" appears in the top left corner of the screen.

To switch Teletext off, press **TV**.

Superimposing a Teletext page on the TV picture

Press **TEXT**.

Each time you press **TEXT**, the screen changes as follows:



To switch Teletext off, press **TEXT** or **TV**.

Notes

- When watching TWIN PICTURE, if you press **TEXT**, the left screen picture will automatically move to the right screen and the Teletext screen will be superimposed on the left screen. If you turn the TV off and on, the original left screen picture will appear.
- When watching TWIN PICTURE, if you select subtitles, news flash, etc., they will appear on the left screen.

Checking the contents of a Teletext service (INDEX)

When Teletext is switched on, you can display the Teletext menu.

- 1 Press **MENU**.

▶ INDEX
TEXT CLEAR
SUBTITLES
REVEAL
TIME PAGE
SUBPAGE

- 2 Press **Δ + or ∇ -** to move the cursor (▶) to **INDEX**, and press **ENTER**.

Selecting a Teletext page

Press the number buttons to enter the three-digit page number of the Teletext number you want. If you make a mistake, re-enter the correct page number. If there is no Teletext page, "Page not available" appears in the bottom left corner of the screen.

To access the next or previous page, press **PROGR +/-**.

Note

- When you request another Teletext page while viewing one Teletext page, the page scrolling may pause on a different page depending on the Teletext service, but the search will continue till the requested page is displayed.

Preventing a Teletext page from being updated (HOLD)

A Teletext page may consist of several subpages. You can stop the page scrolling in order to read the text at your own pace.

Press **VIDEO/HOLD**.

HOLD appears in the top left corner of the screen.

To resume normal Teletext operation, press **TEXT**.

Using FASTEXT

This feature allows you to quickly access a Teletext page that uses FASTEXT. When a FASTEXT page is broadcast, a color-coded menu appears at the bottom of the screen. The colors of the menu correspond to the red (TV/VIDEO), green (FREEZE), yellow (SKIP) and blue (PIP) buttons on the remote commander. These colored buttons function as the FASTEXT buttons in Teletext mode.

Press the colored button which corresponds to the color-coded menu.

The page is displayed after a few seconds.

Enlarging the Teletext display (ENLARGE)

Each time you press **A/B/ENLARGE**, the Teletext display changes as follows:

→ Enlarge upper half → Enlarge lower half → Normal size →

Revealing concealed information (REVEAL)

Sometimes pages contain concealed information, such as answers to a quiz. The reveal option discloses the information.

- 1 Press **MENU**.

- 2 Press **Δ + or ∇ -** to move the cursor (▶) to **REVEAL**, and press **ENTER**.

To conceal the information again, repeat step 2.

Clearing Teletext (TEXT CLEAR)

- 1 Select the Teletext page to which you want to refer.

- 2 Press **MENU**.

- 3 Press **Δ + or ∇ -** to move the cursor (▶) to **TEXT CLEAR**, and press **ENTER**.

To restore the normal Teletext reception, press **TEXT**.

Note

- When watching TWIN PICTURE, no picture appears on the left screen.

Displaying subtitles (SUBTITLES)

Your Teletext service informs you if a TV program is subtitled.

- 1 Press **MENU**.

- 2 Press **Δ + or ∇ -** to move the cursor (▶) to **SUBTITLES**, and press **ENTER**.

Note

- If the subtitles are not broadcast on page 888, select the subtitle page using the number buttons.

Displaying a Teletext page at the requested time (TIME PAGE)

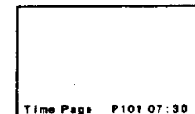
You can display a time-coded page (e.g. an alarm page) at the time you preset.

- 1 Press **MENU**.

- 2 Press **Δ + or ∇ -** to move the cursor (▶) to **TIME PAGE**, and press **ENTER**.

- 3 Press the number buttons to enter three digits for the desired page.

- 4 Press the number buttons to enter four digits for the desired time. For example, to enter 7:30, press 0, 7, 3 and 0.



At the requested time, the page appears on the screen.

To restore the normal Teletext reception, press **TEXT**.

Note

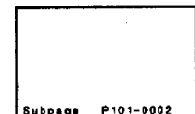
- When watching TWIN PICTURE, no picture appears on the left screen while waiting for a requested Teletext page.

Displaying a particular page among several subpages (SUBPAGE)

- 1 Press **MENU**.

- 2 Press **Δ + or ∇ -** to move the cursor (▶) to **SUBPAGE**, and press **ENTER**.

- 3 Press the number buttons or **PROGR +/-** to enter four digits for the desired subpage. For example, to display the second page of a sequence, press 0, 0, 0 and 2.

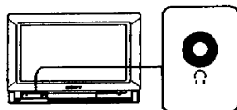


Using headphones

You can use headphones to enjoy the sound of the TV. This feature also allows you to enjoy the sound of PIP and TWIN PICTURE screens.

Listening to the sound of the TV with headphones

- 1 Insert the headphones into the headphone jack located on the front panel of the TV.



- 2 Press MENU and press Δ + or ∇ - to select FEATURES, and press ENTER.

```
FEATURES▷
▷WIDE MODE: WIDE ZOOM
AV OUT: VIDEO
SLEEP: OFF
NR: OFF
TILT CORRECTION: +1
S1 VIDEO: ON
HEADPHONE VOLUME: 30
```

- 3 Press Δ + or ∇ - to select HEADPHONE VOLUME, and press ENTER.

```
FEATURES
WIDE MODE: WIDE ZOOM
AV OUT: VIDEO
SLEEP: OFF
NR: OFF
TILT CORRECTION: +1
S1 VIDEO: ON
▷HEADPHONE VOLUME: 30
```

- 4 Press Δ + or ∇ - to select volume level, and press ENTER.

```
FEATURES
WIDE MODE: WIDE ZOOM
AV OUT: VIDEO
SLEEP: OFF
NR: OFF
TILT CORRECTION: +1
S1 VIDEO: ON
▷HEADPHONE VOLUME: 65
```

- 5 Press MUTE to eliminate the sound of the TV's speaker.

Setting the output of your headphones

When using TWIN PICTURE and PIP, you will have to select the output of your headphones. For example, with TWIN PICTURE, you can select RIGHT or LEFT picture sound. Whereas with PIP, you can select MAIN or SUB picture sound.

- 1 Press Δ + or ∇ - to select HEADPHONE OUT from the TWIN PIC/PIP menu, and press ENTER.

```
TWIN PIC/PIP▷
TWIN/PIP: TWIN1
PROGRAM INDEX
STROBE
STROBE SPEED: HIGH
POSITION: 0
▷HEADPHONE OUT: RIGHT
```

- 2 If currently using TWIN PICTURE, select RIGHT or LEFT.
or,
If currently using PIP, select MAIN or SUB.

```
TWIN PIC/PIP▷
TWIN/PIP: TWIN1
PROGRAM INDEX
STROBE
STROBE SPEED: HIGH
POSITION: 0
▷HEADPHONE OUT: LEFT
```

If the TV speaker output is currently the right TWIN PICTURE and you select a left HEADPHONE OUT, you will have to press MUTE to eliminate the sound of the TV's speaker.

Notes

- The factory preset for HEADPHONE OUT is MAIN.
- AUDIO SWAP cannot be used with the headphones.
- The $\odot$ display will appear indicating which TWIN PICTURE screen's sound is being received by headphones.

Customizing the TV

Using the AV OUT (advance rec-out) terminal

You can select the output signal from the VIDEO/TV OUT jacks at the rear of the TV. The S Video output can be used only when VIDEO is selected. However, it cannot be used in Program Index or Strobe mode even though VIDEO is selected.

- 1 Press MENU.
- 2 Press Δ + or ∇ - to select FEATURES, and press ENTER.

```
FEATURES▷
▷WIDE MODE: WIDE ZOOM
AV OUT: VIDEO
SLEEP: OFF
NR: OFF
TILT CORRECTION: +1
S1 VIDEO: ON
HEADPHONE VOLUME: 30
```

- 3 Press Δ + or ∇ - to select AV OUT, and press ENTER.
- 4 Press Δ + or ∇ - to select the output signal, and press ENTER.

Select	To
TV	Output the TV signal.
VIDEO	Output the signal of the picture you are watching as a main picture. (For Twin Picture, a left picture will be output.)

Selecting a TV program output from VIDEO/TV OUT jacks while using the PIP feature

When watching a TV program in the main screen, use PROGR +/-.

Note

- Do not change the channel or use AUDIO SWAP while recording with a VCR through the VIDEO/TV OUT jacks. If you change the channel, it also changes the channel you are recording.

Adjusting the tilt of the picture

You can adjust the tilt of the picture if it is not aligned to the TV screen. This may happen due to the direction of the earth's magnetic fields in relation to the position of the TV.

- 1 Press MENU.
- 2 Press Δ + or ∇ - to select FEATURES, and press ENTER.

```
FEATURES▷
▷WIDE MODE: WIDE ZOOM
AV OUT: VIDEO
SLEEP: OFF
NR: OFF
TILT CORRECTION: +1
S1 VIDEO: ON
HEADPHONE VOLUME: 30
```

- 3 Press Δ + or ∇ - to select TILT CORRECTION, and press ENTER.

- 4 Press Δ + or ∇ - to select the most suitable value to align the picture position, and press ENTER.

TILT CORRECTION:

-5 - -4 - -3 - -2 - -1 - 0 - +1 - +2 - +3 - +4 - +5
press ∇ - press Δ +

Presetting channels manually

To change the program position for a channel or to receive a channel with a weak signal, preset the channel manually.
For example, preset a channel in program position 8.

- 1 Press MENU.
- 2 Press Δ + or ∇ - to move the cursor ($\triangleright$) to PRESET, and press ENTER.

```
PRESET▷
▷AUTO. PROGR
MANUAL PROGR
```

- 3 Press Δ + or ∇ - to select MANUAL PROGR, and press ENTER.

```
MANUAL PROGR▷
▷PR: 01+
LABEL:
AREA: M E/ASIA
CH: C01
AFT: ON
TV SYS: B/G
ATT: OFF
```

(continued)

4 Select the program position to which you want to preset a channel.

- (1) Press Δ + or ∇ - to select PR, and press ENTER.
 - (2) Press Δ + or ∇ - to select 8.
- You can also select the program position with PROGR +/- or the number buttons (e.g. for program 24, press +/-, 2 and 4).

(3) Press ENTER.

5 Select your area (channel system).

For the areas allocated in each channel system, see "Channel allocation" on page 24.

- (1) Press Δ + or ∇ - to select AREA, and press ENTER.
- (2) Press Δ + or ∇ - to select your area, and press ENTER.

6 Select a channel which you want to preset.

- (1) Press Δ + or ∇ - to select CH, and press ENTER.
- (2) Press Δ + or ∇ - until the channel you want appears on the screen.
You can also select the channel directly using the number buttons. Press C (once for VHF/UHF channels, twice for cable TV channels), then the number buttons (e.g., for channel 5, press 0 and 5).
- (3) Press ENTER.

To preset other channels

Repeat steps 4 to 6.

Disabling program positions

By disabling unused or unwanted program positions, you can skip those positions when you press PROGR +/-.

For example, disable program position 8.

1 Display the MANUAL PROGR menu. (Follow steps 1 to 3 in "Presetting channels manually" on page 21.)

2 Press Δ + or ∇ - to move the cursor ($\blacktriangleright$) to PR, and press ENTER.

3 Press PROGR + or - until 8 appears.

4 Press Δ + or ∇ - to select "-", and press ENTER.

To skip other program positions, repeat steps 3 and 4.

To restore the skipped program positions In step 4 above, press Δ + or ∇ - to select "+," and press ENTER.

Customizing channel names

You can caption each channel number using up to five letters to be displayed on the screen.

1 Display the MANUAL PROGR menu. (Follow steps 1 to 3 in "Presetting channels manually" on page 21.)

2 Press Δ + or ∇ - to move the cursor ($\blacktriangleright$) to PR, and press ENTER.

3 Press Δ + or ∇ - to select the program position you want to caption and press ENTER.

4 Press Δ + or ∇ - to move the cursor ($\blacktriangleright$) to LABEL, and press ENTER.

5 Press Δ + or ∇ - to select a letter or number, and press ENTER for each caption space (up to five.)

Each time you press Δ + or ∇ -, the letter (number) changes as shown below.

A $\rightarrow$ B $\rightarrow$... $\rightarrow$ Z $\rightarrow$ 0 $\rightarrow$ 1 $\rightarrow$... $\rightarrow$ 9 $\rightarrow$ - $\rightarrow$ / $\rightarrow$. $\rightarrow$ + $\rightarrow$ _ (space)

For the caption space you want to leave blank, select "_."

6 Repeat steps 2 to 5 to caption other channels.

To erase a caption

In step 5 above, select "_ (space)."

Manual fine-tuning

Normally, the automatic fine-tuning (AFT) is operating. However, if the picture of a channel is distorted, you can use the manual fine-tuning function for the channel to obtain better picture reception.

1 Display the MANUAL PROGR menu. (Follow steps 1 to 3 in "Presetting channels manually" on page 21.)

2 Press Δ + or ∇ - to move the cursor ($\blacktriangleright$) to PR, and press ENTER.

3 Press Δ + or ∇ - to select the program position corresponding to the channel which you want to manually fine-tune, and press ENTER.

4 Press Δ + or ∇ - to move the cursor ($\blacktriangleright$) to AFT, and press ENTER.

5 Press Δ + or ∇ - to select OFF, and press ENTER.

6 Press Δ + or ∇ - to fine-tune the channel so that you get the best TV reception.

As you press these buttons, the frequency changes from -128 to +128.

7 After fine-tuning, press ENTER.

The fine-tuned level is stored.

Improving TV signal

If the reception signal is very strong, you can attenuate it to obtain better picture reception.

1 Display the MANUAL PROGR menu. (Follow steps 1 to 3 in "Presetting channels manually" on page 21.)

2 Press Δ + or ∇ - to move the cursor ($\blacktriangleright$) to PR, and press ENTER.

3 Press Δ + or ∇ - to select the program position corresponding to the channel whose signal is very strong, and press ENTER.

4 Press Δ + or ∇ - to move the cursor ($\blacktriangleright$) to ATT, and press ENTER.

5 Press Δ + or ∇ - to select ON, and press ENTER.

Setting S1 Video

The default setting for S1 Video in the FEATURES menu is ON. If an S1 Video signal is received, the TV will automatically display the screen in FULL mode. You can turn this function off by setting S1 VIDEO to OFF.

1 Press MENU

2 Press Δ + or ∇ - to move the cursor ($\blacktriangleright$) to FEATURES, and press ENTER.

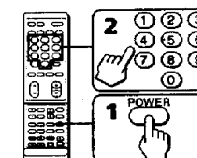
FEATURES $\Rightarrow$
 $\blacktriangleright$ WIDE MODE: WIDE ZOOM
 AV OUT: VIDEO
 SLEEP: OFF
 NR: OFF
 TILT CORRECTION: +1
 S1 VIDEO: ON
 HEADPHONE VOLUME: 30

3 Press Δ + or ∇ - to move the cursor ($\blacktriangleright$) to S1 VIDEO, and press ENTER.

4 Press Δ + or ∇ - to select ON or OFF, and press ENTER.

Setting the remote command mode

You can use the supplied remote commander to operate the TV and Sony video equipment, such as a VCR or multi-disc player. To operate Sony video equipment, first set the remote command mode for the video equipment you want to use.

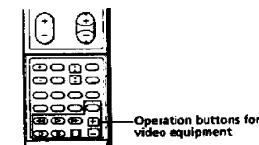


1 Press and hold the POWER button in the VCR control area.

2 Press the number buttons that correspond to the remote command mode.

Mode number buttons	Remote command mode
0 and then 1	VTR1 (e.g., Beta format VCR)
0 and then 2	VTR2 (e.g., 8 mm format VCR)
0 and then 3	VTR3 (e.g., VHS format VCR)
0 and then 4	MDP (multi-disc player)

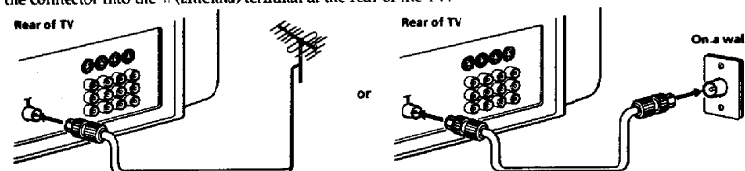
After setting the remote command mode, you can use the following buttons to operate the video equipment.



Connections

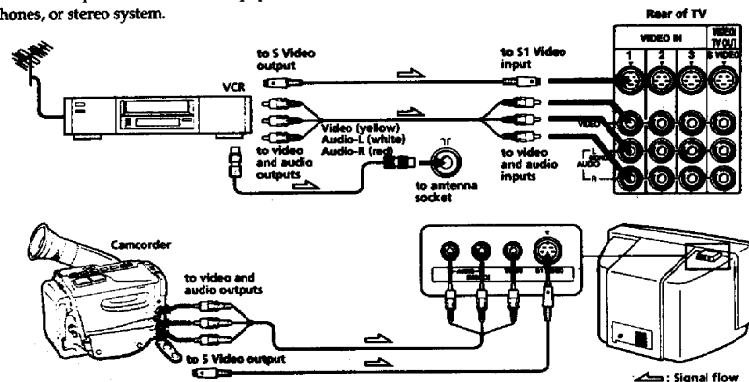
Connecting a VHF antenna or a combination VHF/UHF antenna—75-ohm coaxial cable (round)

Attach an optional IEC antenna connector to the 75-ohm coaxial cable. Plug the connector into the 1F (antenna) terminal at the rear of the TV.



Connecting optional equipment

You can connect optional audio/video equipment to this TV such as a VCR, multi-disc player, camcorder, headphones, or stereo system.



When connecting a monaural VCR
Connect the yellow plug to VIDEO and the white plug to AUDIO-L (mono).

Note on the S1 Video signal
When the S1 Video signal is input through the VIDEO IN 1/2/3 jack, set AUTO WIDE to OFF if you do not want to display the picture in full wide mode (see page 11).

If both S Video and video signals are input
The S Video input signal is selected. To view a video signal, disconnect the S Video connection.

Note on the video input
When no signal is input, the screen becomes blue.

When connecting a VCR to the VIDEO IN 3 jacks
This TV is equipped with two sets of the VIDEO IN 3 jacks. Two sets are not available to be used at the same time. When using equipment connected, turn off other equipment not in use.

Troubleshooting

If you have any problems, read this manual again and check the countermeasure for each of the symptoms listed below.

If the problem persists, contact your nearest authorized service center or dealer.

Snowy picture Noisy sound



- Check the antenna.
- Check the antenna connection on the TV and on the wall.

Dotted lines or stripes



- This may be caused by local interference (e.g. cars, neon signs, hair dryers, etc.) Adjust the antenna for minimum interference.

Double images or "ghosts"



- This may be caused by reflections from nearby mountains or buildings. A highly directional antenna may improve the picture.

Good picture Noisy sound



- Check the TV SYSTEM setting.

No picture No sound



- Press POWER.
- Press POWER to turn the TV off for 5 to 6 seconds, then turn it on again by pressing POWER.
- Check the antenna connection.
- Check the VCR connections.

Good picture No sound



- Press VOL +.
- Press MUTE.

No color



- Adjust COLOR in the VIDEO CONTROL menu's ADJUSTMENT option.
- Check the COLOR SYSTEM setting.

TV cabinet creaks

- Even if the picture or the sound is normal, changes in the room temperature sometimes make the TV cabinet expand or contract, making a noise. This does not indicate a malfunction.

Channel allocation

Areas allocated in each channel system

M E/ASIA/CATV W EURO

Afghanistan, Albania, Algeria, Austria, Bahrain, Bangladesh, Belgium, Brunei, Canary Islands, Cyprus, Denmark, Egypt, Finland, Germany, Ghana, Gibraltar, Greece, Iceland, India, Indonesia, Iran, Iraq, Italy, Jordan, Kenya, Republic of Korea, Kuwait, Lebanon, Liberia, Libya, Luxemburg, Malaysia, Malta, Mauritania, Mauritius, Maldives Rep., Morocco, Mozambique, Nepal, Netherlands, New Zealand, Nicaragua, Nigeria, Norway, Oman, Pakistan, Portugal, Qatar, Sarawak, Saudi Arabia, Seychelles, Sierra Leone, Singapore, Spain, Sri Lanka, Sudan, Swaziland, Sweden, Switzerland, Syrian Arab Rep., Tanzania, Thailand, Tunisia, Turkey, Uganda, United Arab Emirates, Western Sahara, Yemen Arab Republic, People's Dem. Rep. of Yemen, Yugoslavia, Zambia, Zimbabwe

AUSTRALIA

Australia, New Zealand

HK/UK

Hong kong, Ireland, Lesotho, South Africa, United Kingdom

CHINA/EURO

Benin, Bulgaria, China, Congo, Czechoslovakia, Djibouti Republic, Gabon, Guadeloupe, Guiana, Guinea (P.P.R.), Hungary, Ivory Coast, Dem. People's Rep. of Korea, Madagascar, Mongolia, New Caledonia, Niger, Poland, Reunion, Rumania, Senegal, Tahiti, Togo, Former U.S.S.R., Vietnam, Zaire

AMERICA/CATV AMERICA

Bahama Islands, Barbados, Belize, Bermuda, Bolivia, Burma (UHF), Canada, Chile, Colombia, Costa Rica, Cuba, Dominica Republic, Ecuador, El Salvador, Guam, Guatemala, Haiti, Hawaii, Honduras, Jamaica, Laos, Mexico, Panama, Peru, Philippines, Puerto Rico, Surinam, Taiwan, Trinidad & Tobago, U.S.A., U.S.A. (CATV), Venezuela

JAPAN

Burma (Myanmar) (VHF), Japan (VHF, UHF)

TV and color systems of each channel system

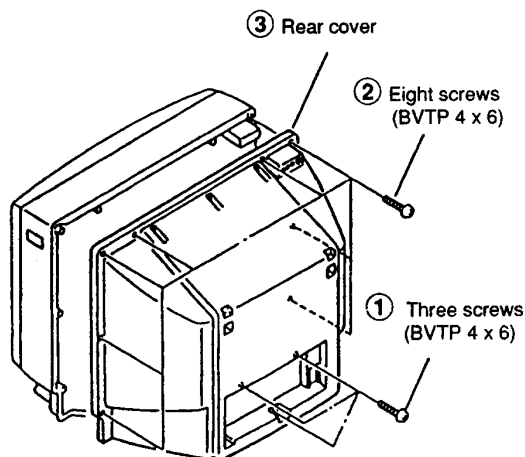
The TV system and color system are automatically set according to the channel system.

Channel system	TV system	Color system
M E/ASIA/ CATV W EURO	B/G, H: West European TV standard	AUTO
AUSTRALIA	B/G, H: Australian TV standard	AUTO
HK/UK	I: British TV standard	AUTO
CHINA/EURO	D/K: East European TV standard	AUTO
AMERICA/CATV AMERICA	M: American TV standard	AUTO
JAPAN	M: Japan TV standard	AUTO

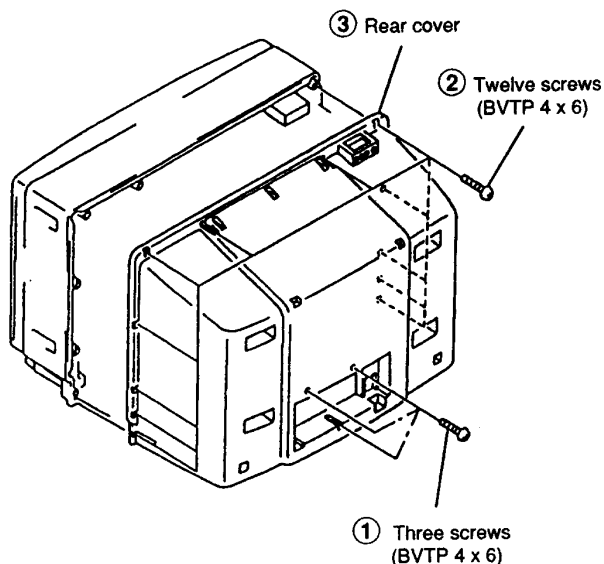
SECTION 2 DISASSEMBLY

2-1. REAR COVER REMOVAL

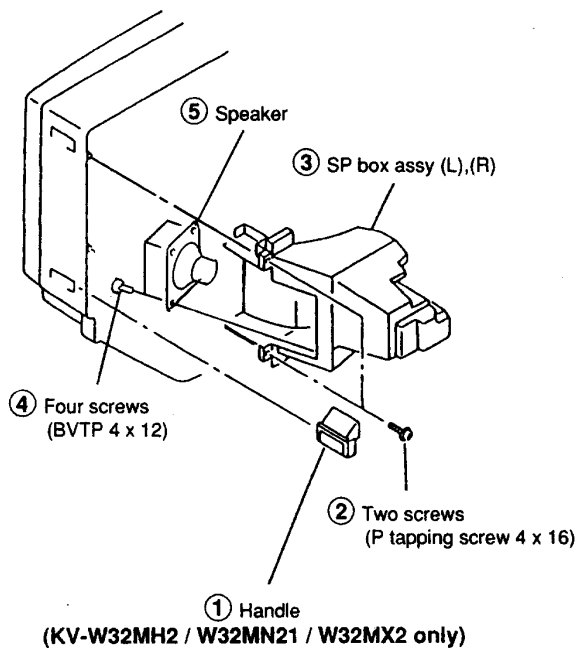
2-1-1. For KV-W28MH2/W28MN21



2-1-2. For KV-W32MH2/W32MN21/W32MX2

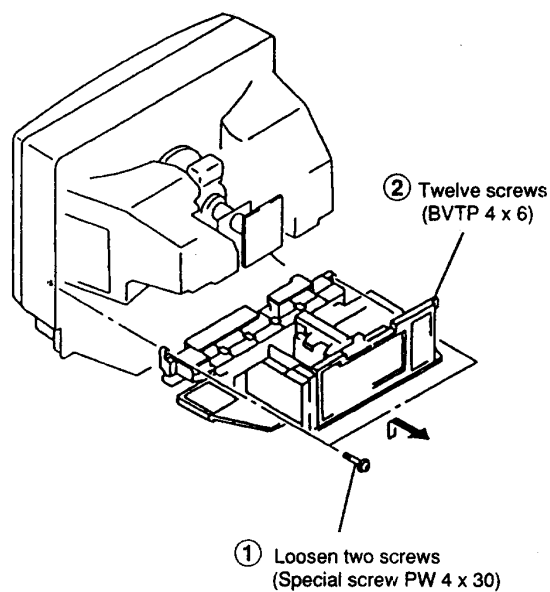


2-2. SPEAKER REMOVAL

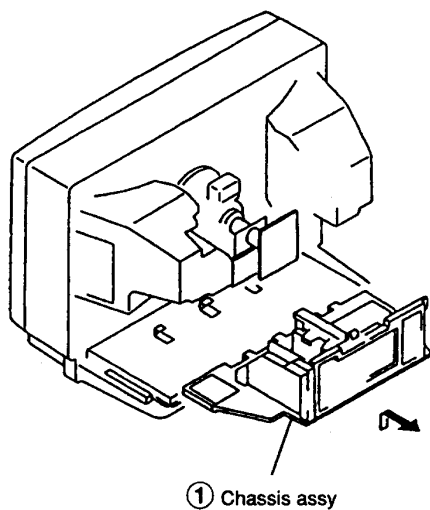


2-3. CHASSIS ASSY REMOVAL

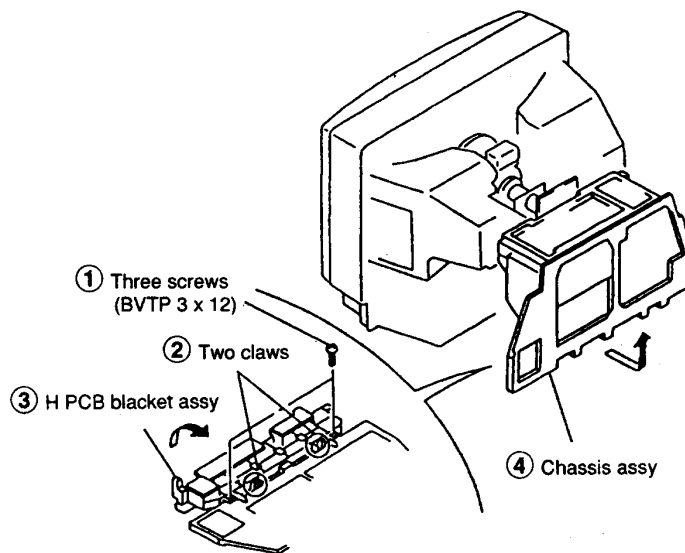
2-3-1. For KV-W28MH2/W28MN21



2-3-2. For KV-W32MH2/W32MN21/W32MX2

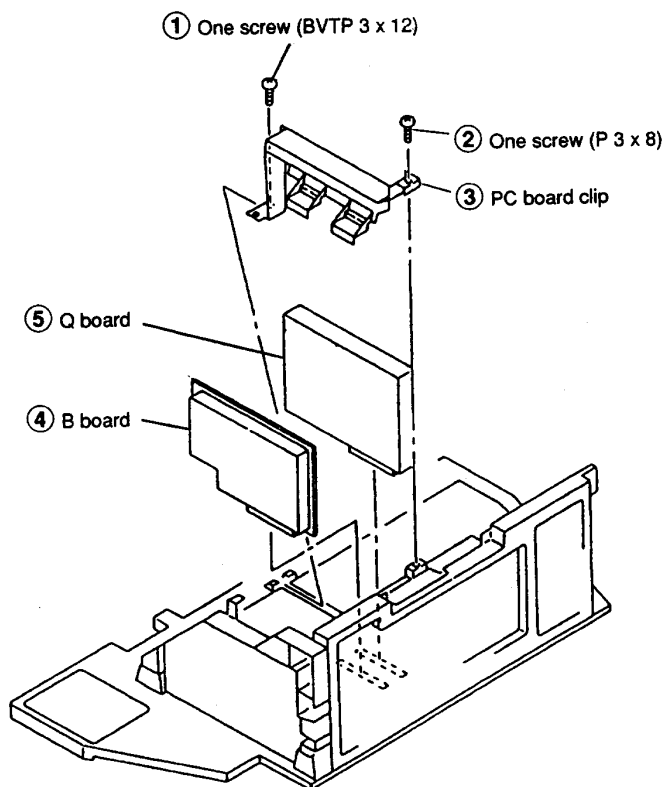


2-4. SERVICE POSITION

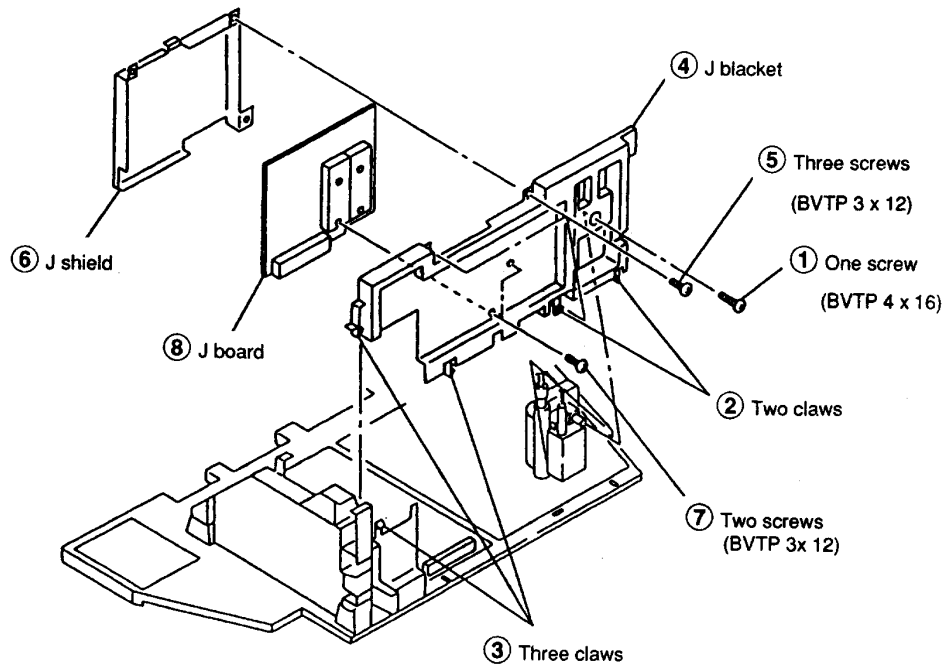


(KV-W28MH2 / W28MN21 only)

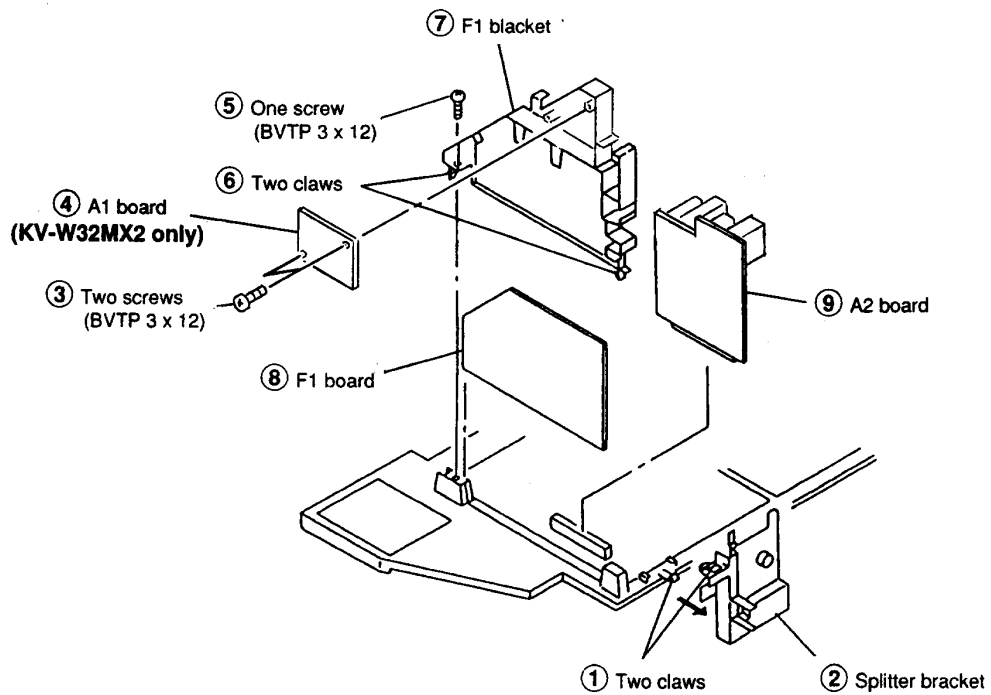
2-5. B AND Q BOARDS REMOVAL



2-6. J BOARD REMOVAL

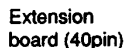


2-7. F1 AND A2 BOARDS REMOVAL



KV-W28MH2/W28MN21**KV-W32MH2/W32MN21/W32MX2****RM-890**

2-8. EXTENSION CABLE AND BOARD



40 pin connector
1-589-554-11
board service
(KW-HD3用)

Four connectors

Four connectors

**V board
(KV-W28MN21/W32MN21 only)**

18 pin

A2 h02

pin

10 min

↓

D1 board

U

///

D2 board

15 pin

40 pin

Extension cable
 10 pin : 3-702-557-01
 15 pin : 3-702-565-01
 18 pin : 3-702-558-01

15 pin : 3-702-565-01

18 pin : 3-702-558-01

1

board

10 pin and 15 pin and 18pin connector

Three connector

2-9. H2 BLOCK ASSY REMOVAL

(For KV-W32MH2/W32MN21/W32MX2)



① Two screws
(BV 3 x 25)

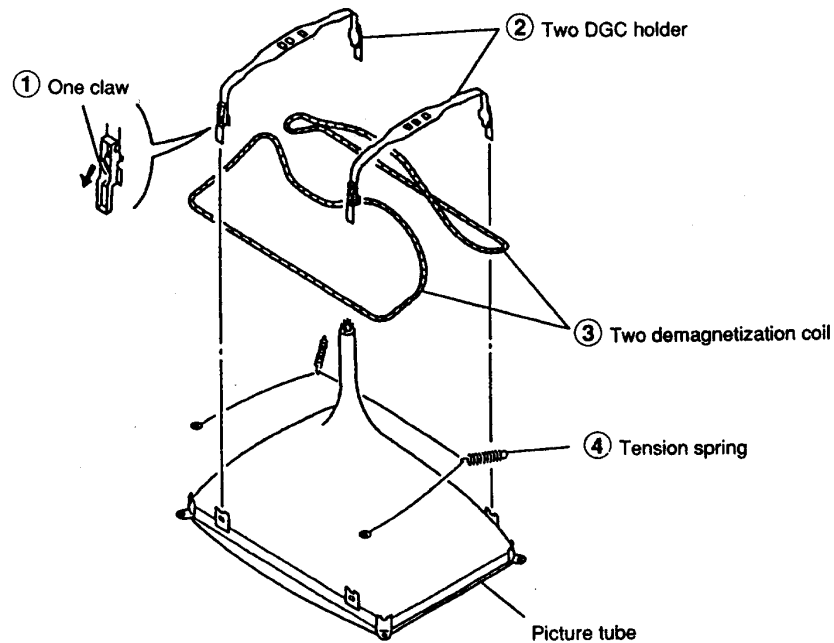
2-10. H1 BLOCK ASSY REMOVAL

(For KV-W32MH2/W32MN21/W32MX2)



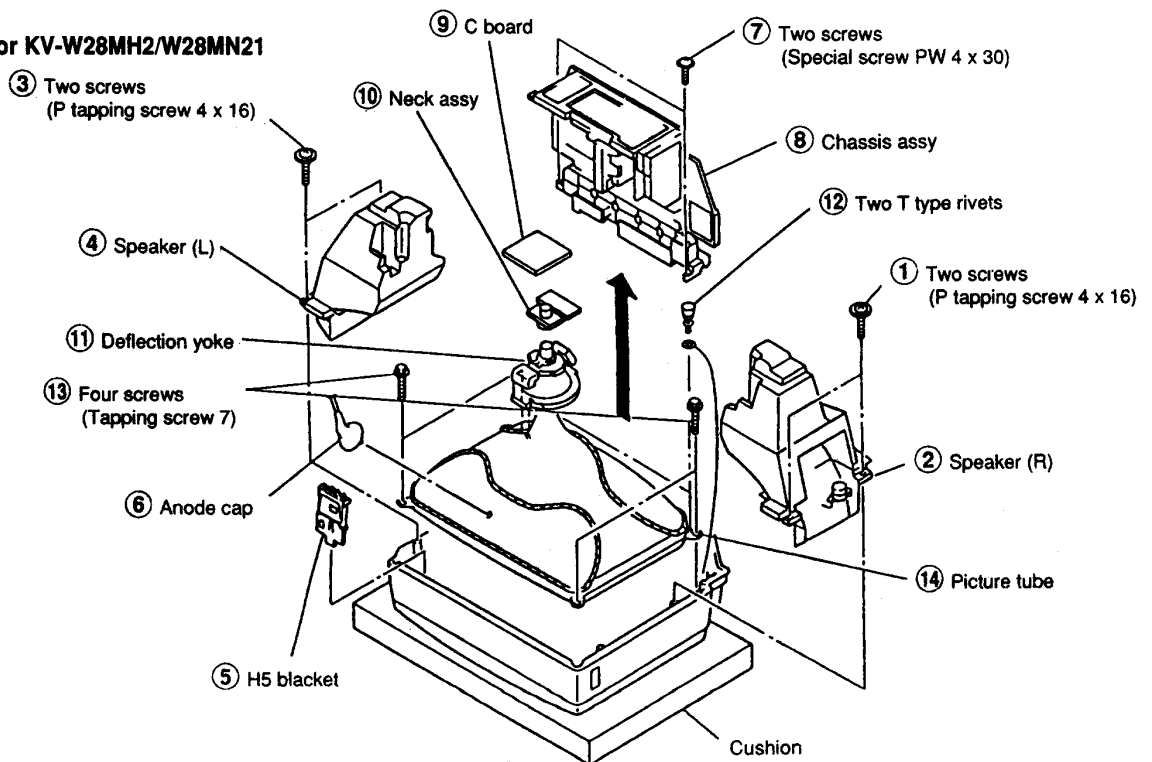
① Three screws
(BV 3 x 25)

2-11. DEMAGNETIZATION COIL REMOVAL

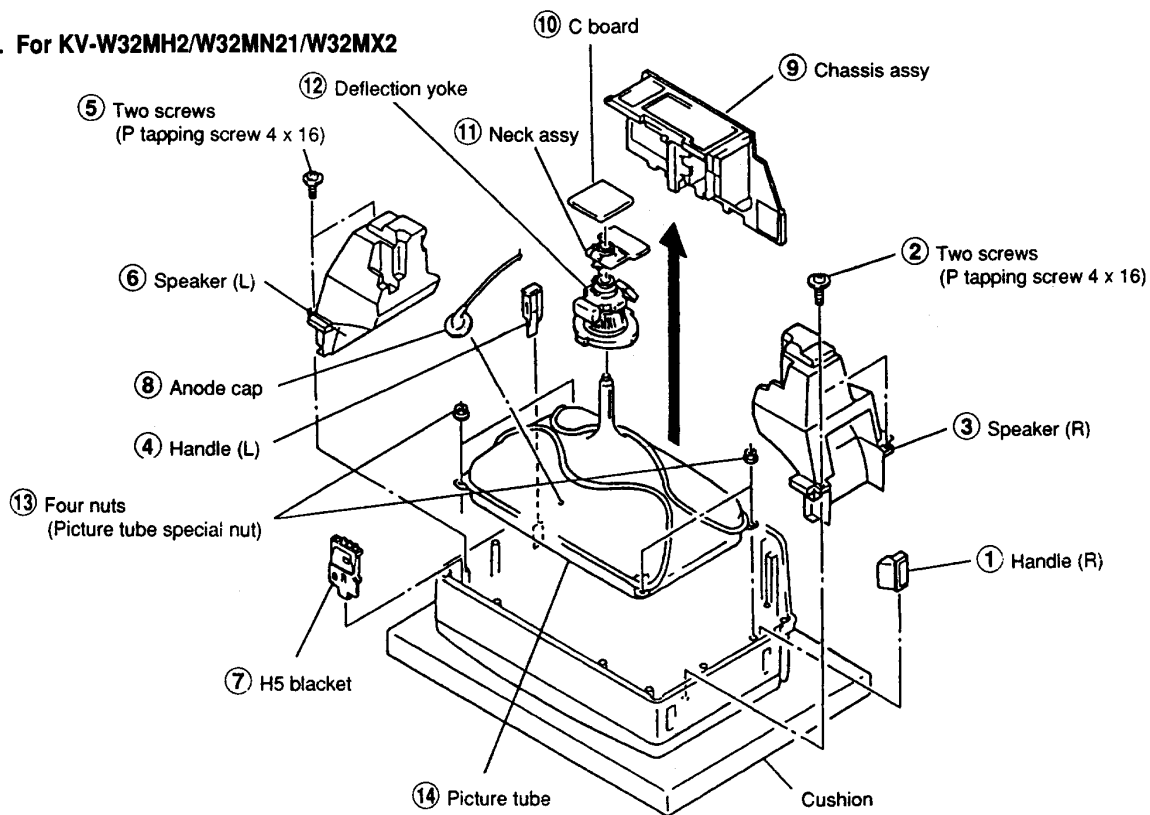


2-12. PICTURE TUBE REMOVAL

2-12-1. For KV-W28MH2/W28MN21



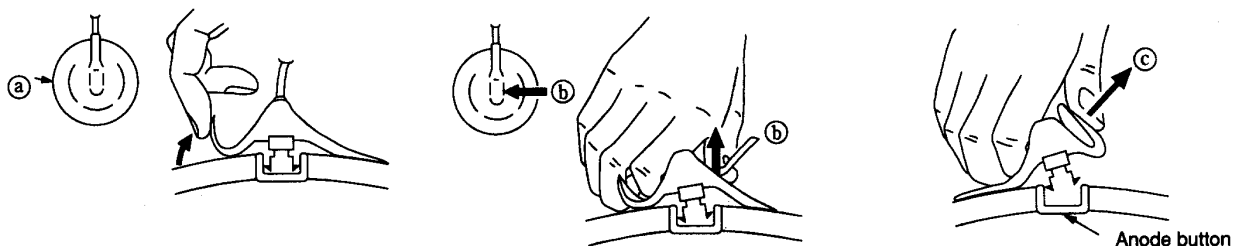
2-12-2. For KV-W32MH2/W32MN21/W32MX2



• REMOVAL OF ANODE-CAP

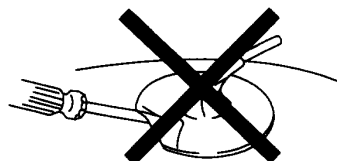
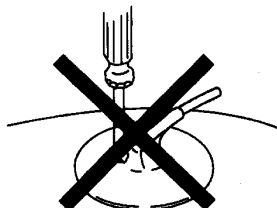
NOTE : Short circuit the anode of the picture tube and the anode cap to the metal chassis, CRT shield or carbon paint on the CRT, after removing the anode.

• REMOVING PROCEDURES



• HOW TO HANDLE AN ANODE-CAP

- ① Don't hurt the surface of anode-caps with sharp shaped material!
- ② Don't press the rubber hardly not to hurt inside of anode-caps!
A material fitting called as shatter-hook terminal is built in the rubber.
- ③ Don't turn the foot of rubber over hardly!
The shatter-hook terminal will stick out or hurt the rubber.



SECTION 3

SET-UP ADJUSTMENTS

- The following adjustments should be made when a complete realignment is required or a new picture tube is installed.
- These adjustments should be performed with rated power supply voltage unless otherwise noted.

Controls and switch should be set as follows unless otherwise noted:

PICTURE control RESET
BRIGHTNESS control CENTER

Perform the adjustments in order as follows :

1. Beam Landing
2. Convergence
3. Focus
4. White Balance

Note : Test Equipment Required.

1. Color-bar/Pattern Generator
2. Oscilloscope

3-1. BEAM LANDING

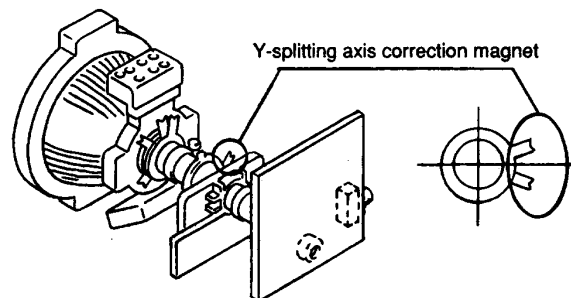
Preparations:

1. In order to reduce the influence of geomagnetism on the set's picture tube face it east or west.
2. Switch on the set's power and degauss with the degausser.

(1) Adjustment of Control Magnet for Y-Splitting Axis

1. Input a crosshatch signal with the pattern generator.
2. Picture control is minimum and brightness control is still normal.
3. Position the neck assy as shown in Fig.3-2.
4. Move the deflection yoke forward to touch the CRT and it stands up rightly.
5. Adjust the upper pin and the lower pin symmetrically by opening or closing the Y-splitting axis correction magnet on the neck assy.
6. Return the deflection yoke to original position.

7. Switch the raster signal to red, then to blue and verify the landing condition.
8. When the position of the deflection yoke has been decided, fasten the deflection yoke with the screws.
9. If the beam does not land correctly in all the corners, use a magnet to adjust it. (See Fig.3-4.)



(2) Landing

1. Input a full-white signal with the pattern generator. Maximize the picture setting and adjust the brightness setting for easy viewing.
2. Rough-adjust the focus, horizontal convergence.
3. Loosen the deflection yoke screws, align the purity adjustment knob to the central position. (See Fig.3-1.)
4. Switch the full-white signal to a mono-green signal.
5. Move the deflection yoke backward and adjust with the purity magnet so that the green is at the center and it aligns symmetrically. (See Fig.3-3.)
6. Move the deflection yoke forward and adjust so that entire screen is green.

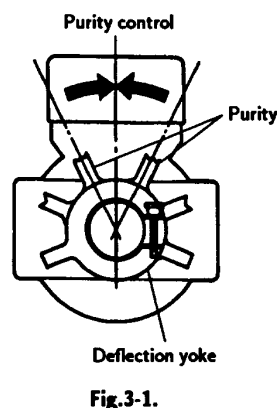


Fig.3-1.

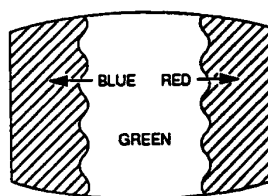


Fig.3-3.

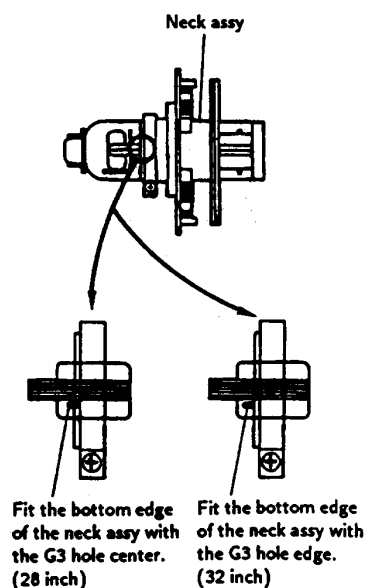


Fig.3-2.

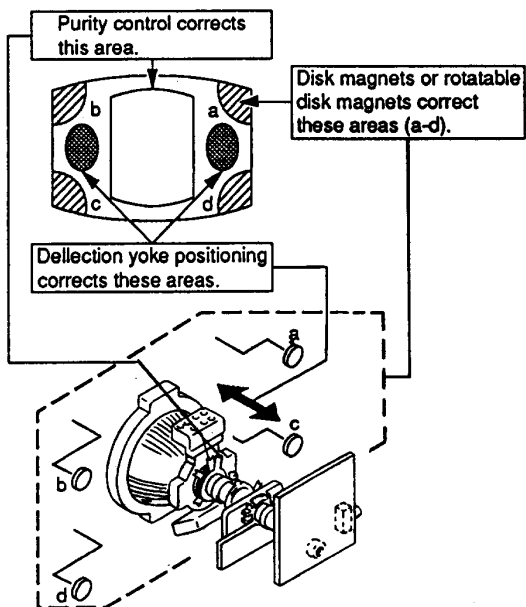


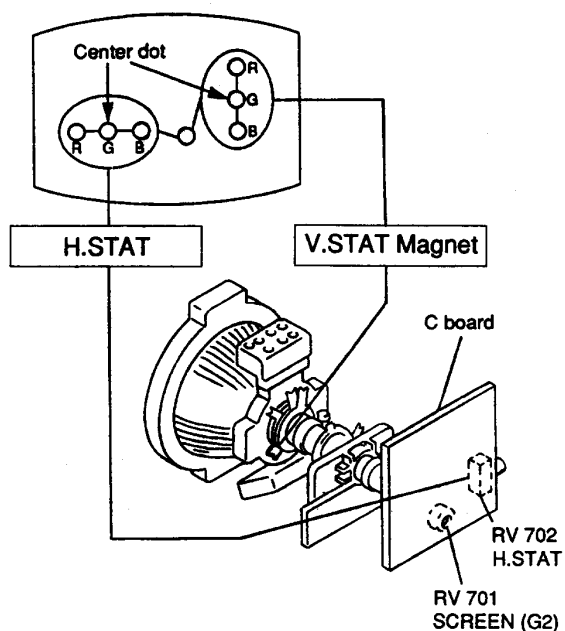
Fig.3-4.

3-2. CONVERGENCE

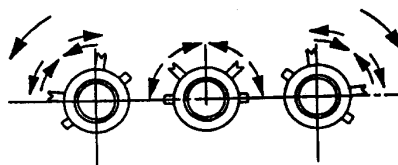
Preparation :

- Before starting this adjustment, adjust the focus, horizontal size, and vertical size.
- Minimize the brightness setting.
- Provide dot pattern.

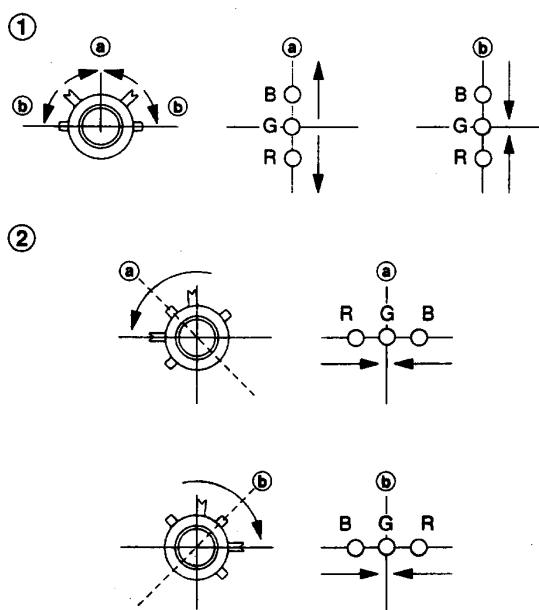
(1) Horizontal and Vertical Static Convergence



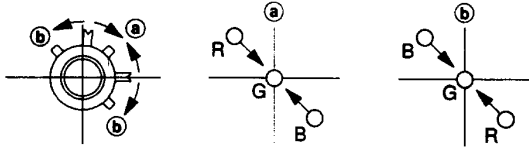
1. (Moving horizontally), adjust the H.STAT control so that the red, green, and blue points are on top of each other at the center of the screen.
 2. (Moving vertically), adjust the V.STAT magnet so that the red, green, and blue points are on top of each other at the center of the screen.
 3. If the H.STAT variable resistor cannot bring the red, green, and blue points together at the center of the screen, adjust the horizontal convergence with the H.STAT variable resistor and the V.STAT magnet in the manner given below. (In this case, the H.STAT variable resistor and the V.STAT magnet influence each other)
- Tilt the V.STAT magnet and adjust the static convergence by opening or closing the V.STAT magnet.



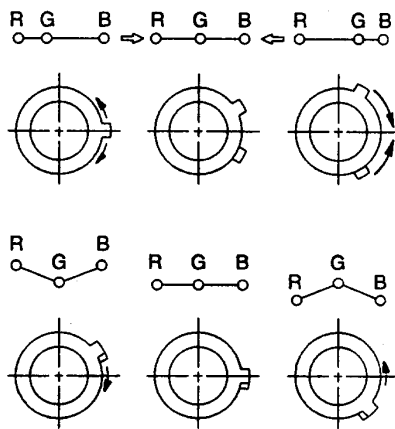
4. If the V.STAT magnet is moved in the direction of the (a) and (b) arrows, the red, green, and blue points move as shown below.



③

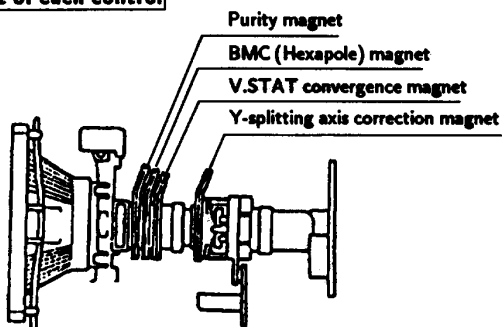


• Operation of BMC (Hexapole) Magnet



- The respective dot positions resulting from moving each magnet interact, so be sure to perform adjustment while tracking.
Use the H.STAT VR to adjust the red, green, and blue dots so they coincide at the center of screen (by moving the dots in the horizontal direction).

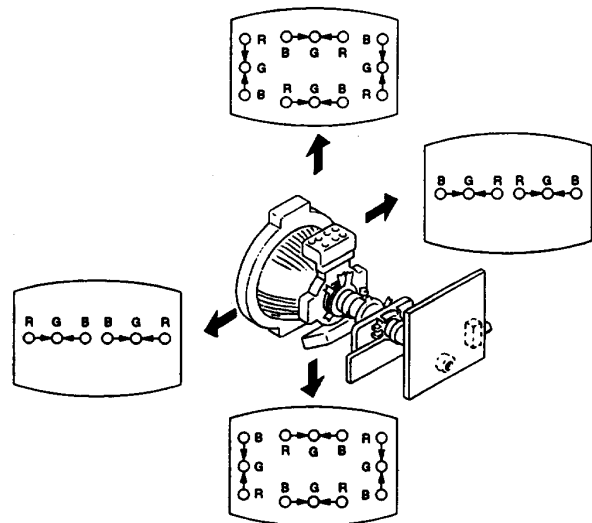
Layout of each control



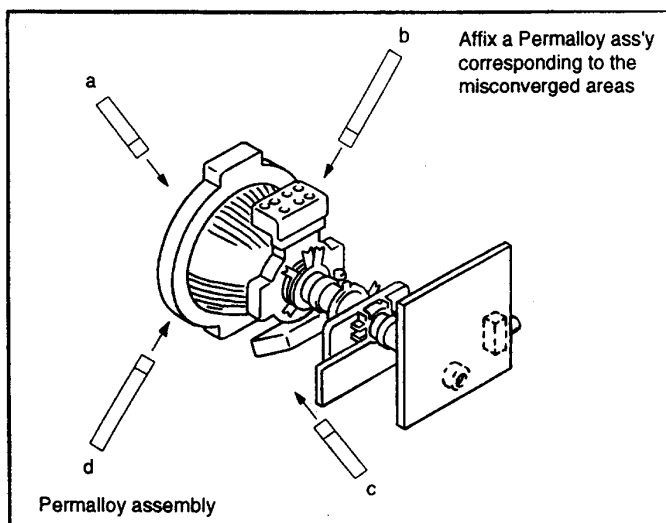
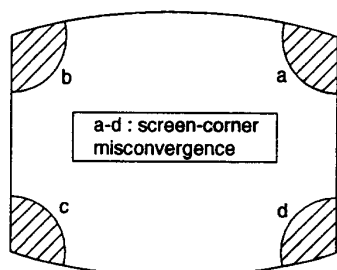
(2) Dynamic Convergence Adjustment

Preparations :

- Before starting this adjustment, adjust the horizontal static convergence and the vertical static convergence.
1. Slightly loosen the deflection yoke screws.
 2. Remove the deflection yoke spacer.



(3) Screen-corner Convergence



*Service adjustment to this model can be performed with the supplied remote commander RM-850.

(Refer to the SECTION 4 Electrical adjustment on how to enter service mode.)

Item number	Adjustment Item	Data range	Standard DATA	Note	Device
			<u>W5/W6/Z5/Z6/S5/S6/N5/N6/F5/F6/MP/T5/T6</u>		
3A	DCS	00~3F	1F	DC Shift	(CXA1526P)
3B	HAP	00~3F	1F	H. Amp	(CXA1526P)
3C	HTL	00~3F	1F	H. Tilt	(CXA1526P)
3D	UYB	00~3F	1F	Upper Y Bow	(CXA1526P)
3E	LYB	00~3F	1F	Lower Y Bow	(CXA1526P)
3F	UCB	00~3F	1F	Upper Corner Bow	(CXA1526P)
40	UTL	00~3F	1F	Upper Tilt	(CXA1526P)
41	LCB	00~3F	1F	Lower Corner Bow	(CXA1526P)
42	LTL	00~3F	1F	Lower Tilt	(CXA1526P)

→ All the same data of each mode.

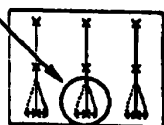
R.G.B.dots movement on the screen of the set



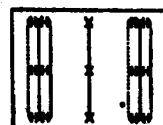
DC SHIFT
Fine adjustment of H.stat



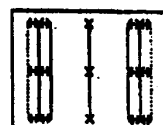
UPPER Y BOW
Adjustment of Y.BOW of the upper section of the screen.



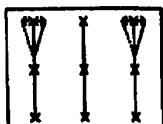
Standard LOWER Y BOW
Adjustment of Y.BOW of the lower section of the screen.



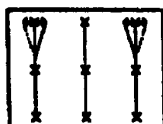
H.AMP
H.AMP adjustment



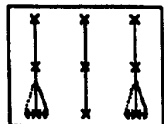
H.TILT
H.TILT adjustment



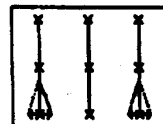
UPPER COR BOW
Adjustment of C.BOW of the upper section of the screen.



UPPER TILT
Adjustment of TILT of the upper section of the screen.



LOWER COR BOW
Adjustment of C.BOW of the lower section of the screen.



LOWER TILT
Adjustment of TILT of the lower section of the screen.

At this time, H.TILT, H.AMP, UPPER TILT, UPPER COR, BOW, LOWER TILT, and LOWER COR, BOW look like all the same, but the movement of the right and left dots are reverse in all the TILT system. (Pay attention to the dotted lines.)

*Service adjustment to this model can be performed with the supplied remote commander RM-890.
(Refer to the SECTION 4 Electrical adjustment on how to enter service mode.)

(4)Dynamic convergence adjustment

1. Adjust horizontal convergence located at the center position of the screen with H STAT VR.
2. Dynamic convergence adjustments are made with the RM-890 that comes with this unit.

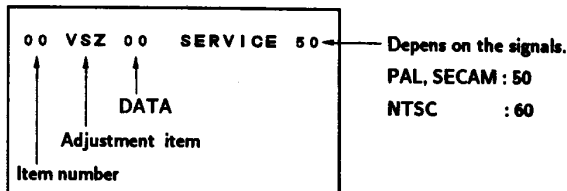
Entering service mode

With the unit on standby

↓
"DISPLAY"
↓
"5"
↓
"VOL (+)"
↓
"POWER"

This operation sequence puts the unit into service mode.

The screen display

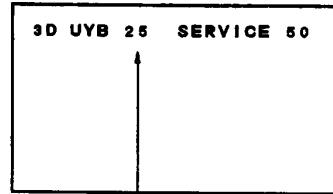


"1", "4"	Raise/lower the service item number
"3", "6"	Raise/lower the data
"MUTE"	Writes
"0"	Executes the writing

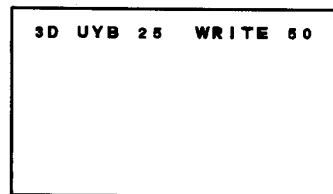
Item Number 3D

This explanation uses UYBOW as an example.

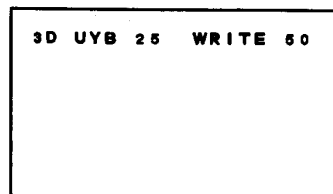
1. Select 3D UYBOW with the "1" and "4" buttons.
2. Raise/lower the data with the "3" and "6" buttons.
3. Select the optimum staste.
4. Write with the MUTE button. (The display changes to WRITE.)
5. Execute the writing with the "0" button.



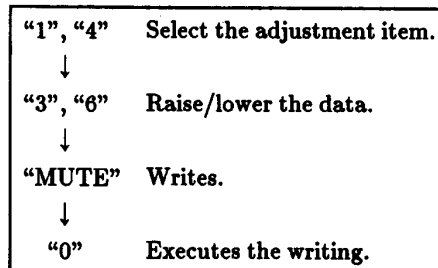
Adjusted with "3" and "6" buttons



Written with "MUTE"

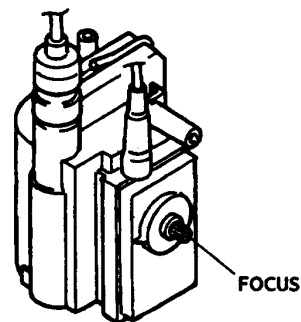


Write excuted with "0"



3-3. FOCUS ADJUSTMENT

Adjust FOCUS control on the flyback transformer for a best focus.

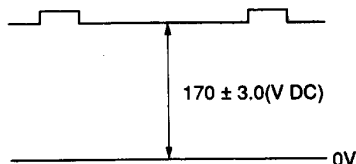


FLYBACK TRANSFORMER (T503)

3-4. G2 (SCREEN), SUB PICTURE AND WHITE BALANCE ADJUSTMENTS

(1) G2 (SCREEN) ADJUSTMENT (RV701)

1. Set the PICTURE and BRIGHTNESS to normal.
2. Put to VIDEO input mode without signals.
3. Set to Service Mode. (To turn off Blue Black.)
4. Change BOF data of the item number "1A" from "00" to "01".
5. Connect R, G, and B of the C board cathode to the oscilloscope.
Adjust R-G, G-G, B-G, data of the item number "0E", "0F", "10" to the value below.



6. Adjust G2 (RV701) volume to make the screen slightly bright.

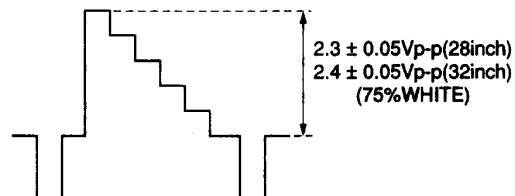
(2) SUB PICTURE ADJUSTMENT (R-G)

1. Receive a NTSC color-bar (75% WHITE) to set to FULL mode.
2. Set the conditions as follows.

SHARPNESS	.....	minimum	
PICTURE	.....	maximum	
COLOR	.....	minimum	
BRIGHT	.....	50%	
SUB BRIGHT	.....	1F	} DATA
SUB PICTURE	.....	18	

3. Connect an oscilloscope to the pin⑥ (R OUT) of CN 508, D board.
4. Set to Service Mode.
5. Select 0F (G-G) and 10 (B-G) with 1 and 4 of the commander and set the data "00" with 3 and 6.
6. Select 0E (R-G) with 1 and 4, and adjust 3 and 6 to get 2.3 ± 0.05 Vp-p (28inch) and 2.4 ± 0.05 Vp-p (32inch).
7. Press **MUTING** → 0 of the commander to write the data.

*Service adjustment to this model can be performed with the supplied remote commander RM-890.
(Refer to the SECTION 4 Electrical adjustment on how to enter service mode.)

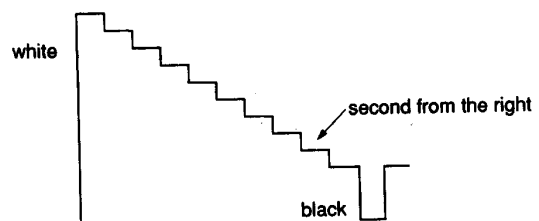


(3) WHITE BALANCE ADJUSTMENTS

1. Input an entire white signal.
2. Set to service mode.
3. Set the PICTURE to maximum.
4. Select G-G (0F) and B-G (10) with 1 and 4, and adjust the level with 3 and 6 for the best white balance.
5. Set the PICTURE to minimum.
6. Adjust the level with RV705 (B.BKG) and RV704 (G.BKG) for the best white balance.
7. Write into the memory by pressing **MUTE** → then 0.

(4) SUB BRIGHT ADJUSTMENT

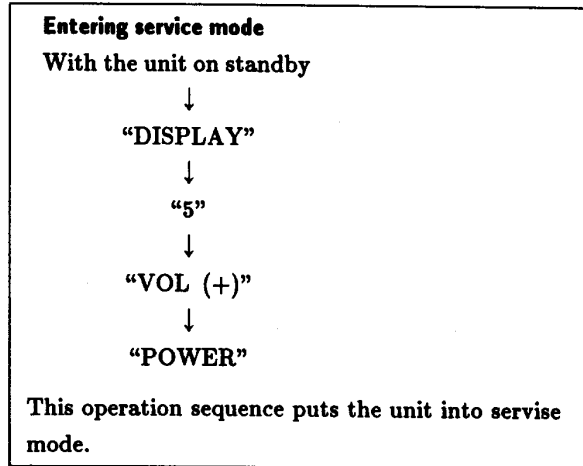
1. Set to service mode.
2. Input a staircase signal of black and white from the pattern generator.
3. BRIGHTNESS ... 50%
PICTURE minimum
4. Select SBT with 1 and 4, and adjust SBT (24) level with 3 and 6 so that the stripe second from the right is dimly lit.



SECTION 4 CIRCUIT ADJUSTMENTS

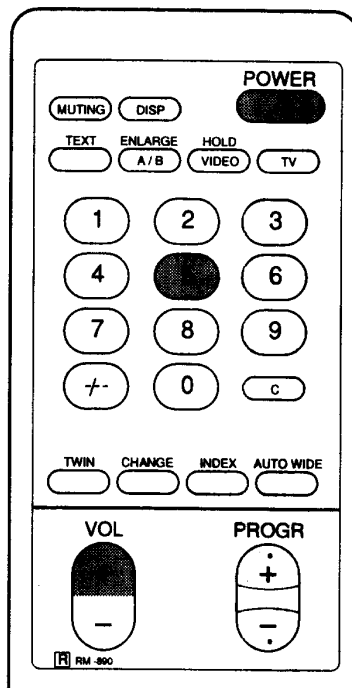
4-1. ADJUSTMENTS WITH COMMANDER

Service adjustments are made with the RM-890 that comes with this unit.



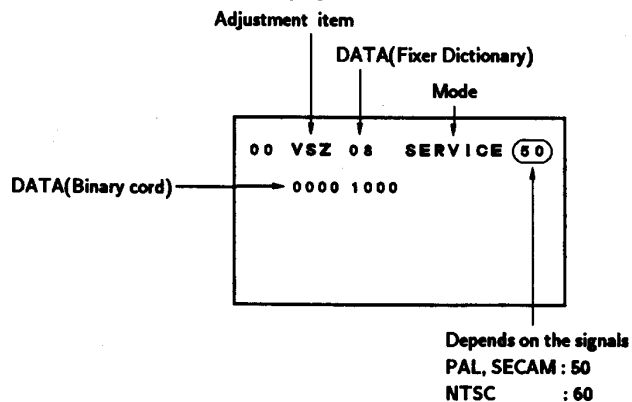
"1", "4"	Raise/lower the service item number
"3", "6"	Raise/lower the data
"MUTE"	Writes
"0"	Executes the writing

"7", "0"	The data all becomes the values in memory
"8", "0"	User control all goes to the standard state
"5", "0"	Service data initialization (Be sure not to use usually.)
"DISP", "0"	Write 50Hz adjustment data to 60Hz, or vice versa.
"2", "0"	Data copy of all WIDE modes.



RM-890

The screen display is :



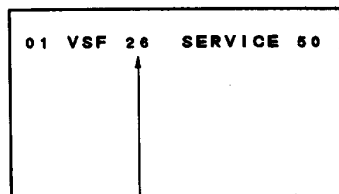
"1", "4"	Select the adjustment item.
↓	
"3", "6"	Raise/lower the data.
↓	
"MUTE"	Writes
↓	
"0"	Executes the writing.

4-2. ADJUSTMENT METHOD

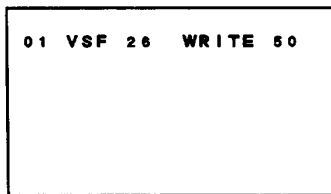
Item Number 01

This explanation uses V-SHFT as an example.

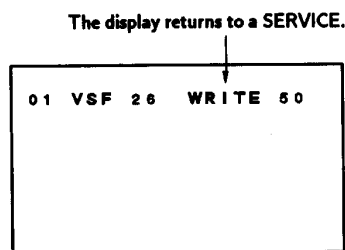
1. Select 01 V-SHFT with the "1" and "4" buttons.
2. Raise/lower the data with the "3" and "6" buttons.
3. Select the optimum state. (The standard setting is for PAL reception.)
4. Write with the MUTE button. (The display changes to WRITE.)
5. Execute the writing with the "0" button.



Adjusted with "3" and "6" buttons



Written with "MUTE"



Write executed with "0"

Item number	Adjustment Item	※ 1 Data range	※ 2 Standard DATA	Note	Device
00	VSZ	00~3F	<u>W5/W6/Z5/Z6/S5/S6/NF5/NF6/MP/T5/T6</u> 30	V-Size V-Shift S-Correction V-Linearity	CXD2018Q
01	VSF	00~3F	26		
02	SCR	00~0F	04		
03	VLN	00~0F	09		
04	HSZ	00~3F	<u>W5/W6/Z5/Z6/S5/S6/N5/N6/F5/F6/MP/T5/T6</u> 2A	H-Size	
05	PAP	00~3F	<u>W5/W6/Z5/Z6/S5/S6/NF5/NF6/MP/T5/T6</u> 20	Pin-Amp	
06	TLT	00~1F	10	Tilt	
07	UCP	00~0F	07	Upper Corner Pin	
08	LCP	00~0F	06	Lower Corner Pin	
09	VBW	00~0F	08	V-Bow	
0A	VAG	00~0F	08	V-Angle	
0B	HVV	00~07	05	HV-Comp-V	
0C	HVH	00~07	00	HV-Comp-H	
0D	HSB	00~3F	<u>W5/W6/Z5/Z6/S5/S6/N5/N6/F5/F6/MP/T5/T6</u> 20	H-Shift	

Note : ※1 Data range area. 00-09,0 A-0 F,10-19,1 A-1 F,20-29,2 A-2 F,30-39,3 A-3 F.

- ※2 Standard Data. • Those are the standard data values written on the microprocessor. There fore the data values of the modes are respectively stored in the memory.
- In case of a device replacement, adjustment by rewriting the data value is necessary for some items afterwards.

Item number	Adjustment Item	Data range	Standard DATA <u>W5/W6/Z5/Z6/S5/S6/N5/N6/F5/F6/MP/T5/T6</u>	Note	Device
0E	R-G	00~3F	1F	→ All the same data of each mode.	TDA4780
0F	G-G	00~3F	1F		
10	B-G	00~3F	1F		
11	RLR	00~3F	1F		
12	GLR	00~3F	1F		
13	BLR	00~3F	1F		
14	PDL	00~3F	29		
15	GMM	00~3F	1F		
16	SC5	00~01	01		
17	DOF	00~01	00		
18	HD	00~01	00		
19	FLB	00~01	00		
1A	BOF	00~01	00		
1B	ADB	00~01	01		
1C	YHI	00~01	00		
1D	MD2	00~01	00	→ All the same data of each mode.	TDA9145
1E	BLS	00~01	00		
1F	YEX	00~01	01		
20	RLC	00~01	00		
21	TCP	00~01	01		
22	SPI	00~1F	18		
23	SCO	00~3F	1F		
24	SBT	00~7F	1F		
25	2SP	00~1F	18		
26	2SC	00~3F	1F		
27	2SB	00~7F	1F		
28	SHU	00~1F	0F	→ All the same data of each mode.	SDA9188-3X
29	SHS	00~1F	0F		
2A	CV	00~01	00		
2B	FON	00~01	01	→ All the same data of each mode.	SDA9188-3X
2C	DLY	00~07	00		
2D	P-V	00~0F	08		
2E	PVS	00~07	01		
2F	P-H	00~3F	0A		
30	PHS	00~0F	02		
31	CTR	00~0F	09	→ All the same data of each mode.	SDA9188-3X
32	DVI	00~1F	07		
33	DVP	00~1F	0F		
34	BRT	00~0F	05		
35	PLL	00~01	00		
36	9V5	00~07	03	→ All the same data of each mode.	SDA9188-3X
37	9V6	00~07	03		
38	9H5	00~07	03		
39	9H6	00~07	03		

KV-W28MH2/W28MN21
KV-W32MH2/W32MN21/W32MX2
RM-890

Item number	Adjustment Item	Data range	Standard DATA	Note	Device
3A	DCS	00~3F	<u>W5/W6/Z5/Z6/S5/S6/N5/N6/F5/F6/MP/T5/T6</u> 1F	DC Shift H. Amp H. Tilt Upper Y Bow Lower Y Bow Upper Corner Bow Upper Tilt Lower Corner Bow Lower Tilt	CXA1526P
3B	HAP	00~3F	1F		
3C	HTL	00~3F	1F		
3D	UYB	00~3F	1F		
3E	LYB	00~3F	1F → All the same data of each mode.		
3F	UCB	00~3F	1F		
40	UTL	00~3F	1F		
41	LCB	00~3F	1F		
42	LTL	00~3F	1F		
43	107	00~01	<u>W5/W6/Z5/Z6/S5/S6/N5/N6/F5/F6/MP/T5/T6</u> 00	Set TMS4C1070 PLLMD Port P27 LFR ON/OFF HWE1 Line Delay Noise Reduction Still Picture Scroll Y Value UV Value	IPQ V3.4 (F/F)
44	P27	00~01	00 → All the same data of each mode.		
45	LFR	00~01	01		
46	HWE	00~0F	0B		
47	NR	00~03	01		
48	STP	00~01	00 → All the same data of each mode.		
49	VWD	00~3F	<u>W5/W6 Z5/Z6/S5/S6 NF5/NF6</u> Invalid 1A Invalid		
4A	Y-V	00~FF	00		
4B	UVV	00~FF	00 → All the same data of each mode.		
4C	TXH	00~FF	05	Text H Position Text V Position WST Layer V Stop Blanking Stop Blanking Start ACQ Soft Slicer Address 7FH Data ACQ Data Slicer Clamping Start Clamping Stop Limit Slicer Adapt Gain MAX. Filter MAX.	TPU3040 (Text)
4D	TXV	00~3F	16		
4E	VSP	00~FF	3B		
4F	BSP	00~FF	3D		
50	BST	00~FF	35		
51	QSF	00~1F	01 → All the same data of each mode.		
52	A7F	00~FF	0A		
53	QDT	00~3F	0D		
54	CST	00~FF	00		
55	CSP	00~FF	50		
56	LMT	00~01	00	→ All the same data of each mode.	
57	GMX	00~FF	FF		
58	FMX	00~FF	FF		

Item number	Adjustment Item	Data range	Standard DATA		Note	Device
59	FAW	00~FF	<u>W5/W6/Z5/Z6/S5/S6/N5/N6/F5/F6/MP/T5/T6</u>		NICAM FAW Thresh NICAM Error Bit MONO NICAM Error Bit NICAM W.G.Error for Forma Data W.G.Stereo Cut Point W.G.Timer W.G.Bilin Cut Point AGC Auto/Const. AGC Gain Const. FM Mono Prescale W.G.Prescale NICAM Prescale Carrier Mute Audio Clock Out W.G.Figure of ID	MSP3410 (Audio, Stereo)
5A	CTM	00~FF	08			
5B	CTN	00~FF	08			
5C	WGO	00~FF	50			
5D	WGS	00~FF	0A			
5E	WGT	00~FF	15			
5F	WGB	00~FF	50			
60	ACG	00~FF	EA			
61	ACG	00~01	01	→ All the same data of each mode.		
62	CDB	00~7F	50			
63	FMP	00~7F	24			
64	WGP	00~7F	3C			
65	NIP	00~7F	7F			
66	CRM	00~01	00			
67	ACO	00~01	01			
67	WAC	00~0F	01			
68	MWH	00~3F	37	50/60Hz → All the same data of each mode.	Main Picture Write Position	CXD2031
69	SW5	00~3F	22		Sub Picture (50Hz) Position	
6A	SW6	00~3F	24	→ All the same data of each mode.	Sub Picture (60Hz) Position	
6B	MRH	00~3F	36	50/60Hz → All the same data of each mode.	Main Picture Read Position	
6C	SBR	00~0F	08	→ All the same data of each mode.	Sub Brightness ADJ	TDA9160A
6D	SH2	00~1F	0F	→ All the same data of each mode.	Sub Hue For Sub Picture	
6E	VCR	00~01	00		D/A	
6F	SEL	00~FF	5F	→ All the same data of each mode.	Separation Level ADJ	CXA1315P
70	AWD	00~03	01	→ All the same data of each mode.	Auto Wide Time 4 Differential	CXP5068H
71	OSH	00~3F	<u>W5/W6/Z5/Z6/S5/S6/N5/N6/F5/F6/MP/T5/T6</u>		OSD Position H Power ON Delay Blue Back N/S User Step No Sync. Mute Disable Degauss User Last Wide No SECAM Block Same Picture Option 0 Option 1	CXP85340A
72	ODL	00~FF	06			
73	BLU	00~01	10	→ All the same data of each mode.		
74	ROS	00~3F	01			
75	MUT	00~01	3F			
76	MUT	00~01	01			
77	DID	00~01	00			
78	DWZ	00~01	01			
79	DSB	00~01	00	→ All the same data of each mode.		
7A	SMP	00~01	00			
7B	OP0	00~FF	00			
7B	OP1	00~FF	6C			
7B	OP1	00~FF	61			

Note : • W5 : Wide Zoom 50Hz
• W6 : Wide Zoom 60Hz
• Z5 : Zoom 50Hz
• Z6 : Zoom 60Hz
• S5 : Subtitle 50Hz
• S6 : Subtitle 60Hz

• N5 : Normal 50Hz
• N6 : Normal 60Hz
• F5 : Full 50Hz
• F6 : Full 60Hz
• MP : Multi PinP
• T5 : Twin 2 50Hz
• T6 : Twin 2 60Hz

KV-W28MH2/W28MN21
KV-W32MH2/W32MN21/W32MX2
RM-890

No 7A OP0 * Input data are different according to models.

Item	D/K STEREO	Text	—	—	—	—	US multi	繁字
KV-W28MH2	0	0	1	0	1	1	0	0
KV-W28MN21	0	1	1	0	1	1	0	0
KV-W32MH2	0	0	1	0	1	1	0	0
KV-W32MN21	0	1	1	0	1	1	0	0
KV-W32MX2	0	0	1	0	1	1	1	1

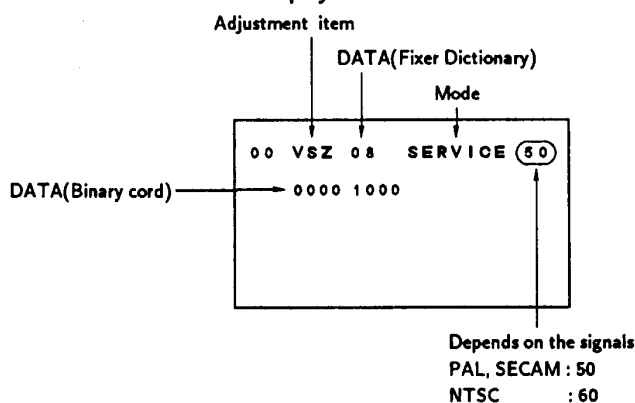
No 7B OP1

Item	rolling	TPU17	TPU16	—	—	—	—	chin
KV-W28MH2	0	1	1	0	0	0	0	1
KV-W28MN21	0	1	1	0	0	0	0	1
KV-W32MH2	0	1	1	0	0	0	0	1
KV-W32MN21	0	1	1	0	0	0	0	1
KV-W32MX2	0	1	1	0	0	0	0	1
ORIGINAL		64	32	16	8	4	2	1

After replacement of A Board IC002 (X24164), please change the Item No.7A (OP0) and 7B (OP1) Data (Binary-code) to the values listed above.

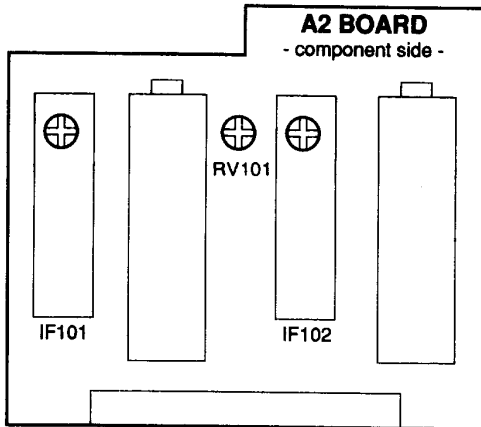
1. Set to Service Mode.
2. Select 7A (OP0) and 7B (OP1) with [1] and [4] buttons of the commander.
3. Establish DATA (Binary-code) with [3] and [6] buttons.

The screen display is :



D/K STEREO	"0" without D/K STEREO
	"1" with D/K STEREO
TEXT	"0" without TEXT
	"1" with TEXT
US multi	"0" without US multi
	"1" with US multi
Chinese	"0" Simplified Chinese
	"1" Chinese
Rolling	"0" Stop rolling header
	"1" Compulsion rolling header
TPU17, TPU16	TPU3040 Version TC20 "1" "1"
	TC18 "1" "0"
China	"0" without Chinese
	"1" with Chinese

4-3. A2 BOARD ADJUSTMENT



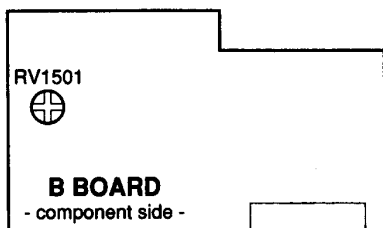
AGC ADJUSTMENT (IF BLOCK)

1. Receive an off-air signal.
2. Adjust the AGC VR (IF101) so that there is no snow noise and cross-modulation.
3. Set to PIP mode. (only 32 inch)
4. Receive an off-air signal with the sub picture.
5. Adjust the AGC VR (IF102) so that there is no snow noise and cross-modulation.

DET ADJUSTMENT (RV101)

1. Receive a PAL all white signal.
2. Connect a digital volt meter to the pin ⑪ and pin ⑫ of CN101.
3. Adjust RV101 to make the pin ⑪ level same as that of pin ⑫.

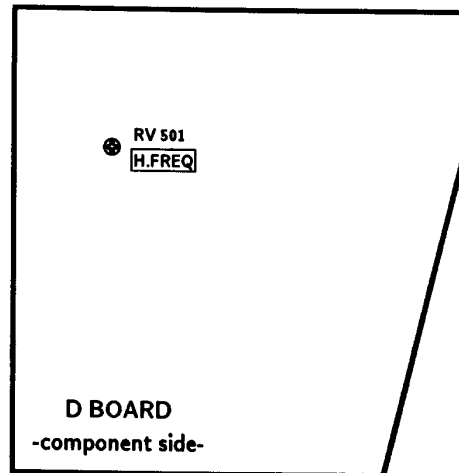
4-4. B BOARD ADJUSTMENT



SCP F0 ADJUSTMENT (RV1501)

1. Receive a PAL color-bar signal.
2. Connect a frequency counter to the pin ⑫ of IC501.
3. Adjust RV1501 for 15.625 ± 0.01 [KHz].

4-5. D BOARD ADJUSTMENT



H. FREQ ADJUSTMENT (RV501)

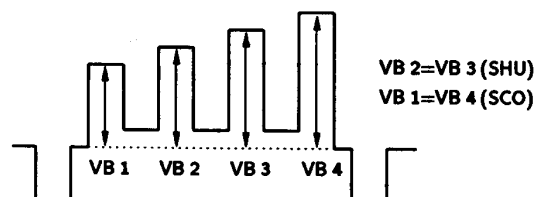
1. Receive a PAL color-bar signal.
2. Short the ground and pin ① of IC502.
3. Connect a frequency counter to the pin ⑫ of IC502.
4. Adjust RV501 for 31.4 ± 0.1 kHz.
5. Disconnect a jumper wire from IC502.

SUB HUE, SUB COLOR ADJUSTMENT (SHU, SCO)

1. Receive a NTSC color-bar to set to FULL mode.
2. Set the conditions as follows.

PICTURE	.....	80%
COLOR	.....	50%
HUE	.....	50%

3. Connect an oscilloscope to the pin ⑦ (B OUT) of CN508, D board.
4. Set to Service Mode.
5. Select 28 (SHU) and 23 (SCO) with [1] and [4], and adjust [3] and [6] to get VB2=VB3 and VB1=VB4.
6. Press [MUTING] → [0] of the commander to write the data.

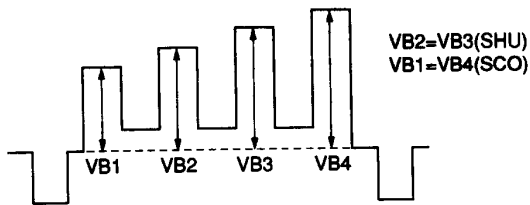


SUB HUE S ADJUSTMENT (SHS)

1. Receive a S video NTSC color-bar to set to FULL mode.
2. Set the conditions as follows.

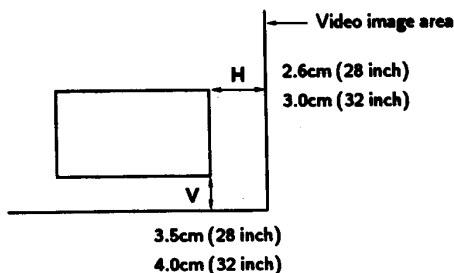
PICTURE	.....	80%
COLOR	.....	50%
HUE	.....	50%

3. Connect an oscilloscope to the pin ⑦ (B OUT) of CN 508, D board.
4. Set to Service Mode.
5. Select 26 (SHS) with ① and ④, and adjust ③ and ⑥ to make VB2=VB3.
6. Press **MUTING** → ⑦ of the commander to write the data.



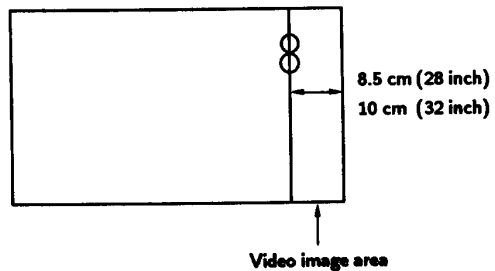
WINDOW PICTURE POSITION ADJUSTMENT (PVS, PHS)

1. Receive a PAL SP color-bar to set to FULL mode.
2. Set to Service Mode.
3. Press **P in P** button of the commander. (RIGHT, LOWER position)
4. Select 2D (P-V) or 2E (PVS) and 2F (P-H) or 3O (PHS) with ① and ④. Then adjust them respectively, with ③ and ④, to 3.5 cm (28 inch) or 4.0 cm (32 inch), and 2.6 cm (28 inch) or 3.0 cm (32 inch).
5. Press **MUTING** → ⑦ of the commander to write the data.



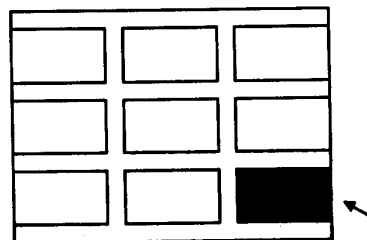
PROGRAM POSITION ADJUSTMENT (OSH)

1. Receive a PAL color-bar to set to FULL mode.
2. Set to Service Mode.
3. Press **DISP** button of the commander.
4. Select 71 (OSH) with ① and ④ of the commander, and set the position as shown below with ③ and ⑥.
5. Press **MUTING** → ⑦ of the commander to write the data.



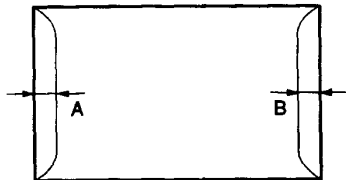
MULTI PIP ADJUSTMENT (9V5, 9V6, 9H5, 9H6)

1. Receive a NTSC monoscope to set to FULL mode.
2. Set to Service Mode.
3. Press **MENU** button of the commander for STROBE mode. (RIGHT, LOWER position)
4. Select 34 (9V6) and 36 (9H6) with ① and ④, and adjust ③ and ⑥ to set the monosco pattern at the frame center.
5. Press **MUTING** → ⑦ of the commander to write the data.
6. Receive a PAL monoscope to set to FULL mode.
7. Press **MENU** button of the commander for STROBE mode. (RIGHT, LOWER position)
8. Select 36 (9V5) and 38 (9H5) with ① and ④, and adjust ③ and ⑥ to set the monosco pattern at the frame center.
9. Press **MUTING** → ⑦ of the commander to write the data.

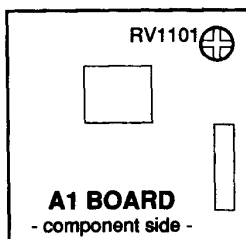


RASTER CENTER ADJUSTMENT (S501, S502)

1. Receive a PAL monoscope to set to FULL mode.
2. Set to Service Mode.
3. Set the condition as follows.
BRIGHTNESS 100%
PICTURE 0%
4. Reduce H. SIZE (HSZ) to have the raster width smaller than the effective screen size.
5. Adjust S501 and S502 for A=B blanking.
6. Return H. SIZE, BRIGHT and PICTURE to the original values.
7. If having moved the purity magnet, adjust the raster center again.



4-6. A1 BOARD ADJUSTMENT

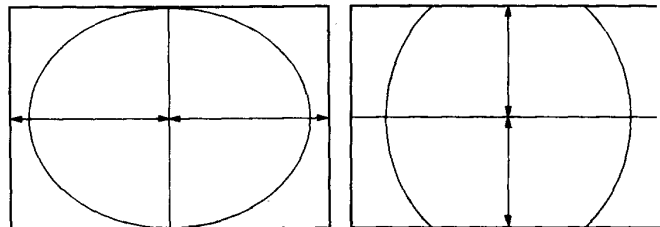


SEPARATION ADJUSTMENT (RV1101)

1. Receive a stereo broadcast signal.
2. Adjust RV1101 so that a clear stereo sound is effected.

NTSC DEF ADJUSTMENT (HWE, VWD)

1. Receive a NTSC monoscope to set to FULL mode.
2. Set to Service Mode.
3. Select HWE (46) with the commander buttons [1] and [4]. Adjust MONOSCOPE pattern with [3] and [6] to bring the pattern measure difference to ± 0.15 measure between the right and left sides.
4. Press [MUTING] → [0] of the commander to write the adjusted data in the addresses of WIDE ZOOM, ZOOM and SUBTITLE.

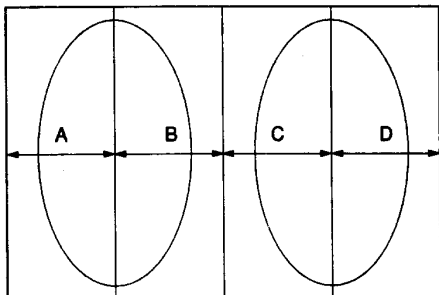


5. Set to ZOOM mode.
6. Select VWD (49) with buttons [1] and [4]. Adjust MONOSCOPE pattern with [3] and [6] to bring the pattern measure difference to ± 0.15 measure between the top and bottom sides.
7. Press [MUTING] → [0] to write the adjusted data.
8. Add 5 to the adjusted data, and write it to SUBTITLE.

TWIN 1 PICTURE PHASE (MRH, MWH, SWH)

1. Receive a PAL monoscope to set to FULL mode.
2. Set to Service Mode.
3. Set to TWIN 1 mode with the commander, and receive monoscope pattern on the right and left screens.
4. Select MRH (6B) with the commander buttons [1] and [4]. With buttons [3] and [6], adjust the right and left pictures to equal size.
5. Select 68 (MWH) and (SWH) with the commander [1] and [4] with buttons [3] and [6], adjust left and right side pictures to Horizontal Center.
6. Press [MUTING] → [0] buttons to write the adjusted data.

- (B) 1. Receive a NTSC signal to set Service Mode.
2. Receive MONOSCOPE pattern. Repeat the adjustments 3 and 4 above.



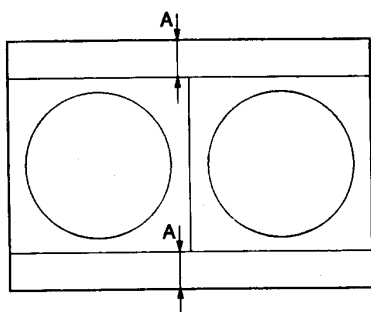
3. Press **MUTING** → **0** buttons to write the adjusted data.

TWIN 2 DEF ADJUSTMENT (VSZ, VSF)

1. Receive a PAL monoscope to set to FULL mode.
2. Set to Service Mode.
3. Set to TWIN 2 mode with the commander, and receive monoscope on the right and left screen.
4. Select VSZ (00) and VSF (01) with the commander buttons **1** and **4**. Adjust the blanking ranges on the screen top and bottom with buttons **3** and **6** as specified below.

28" : A=40±5mm

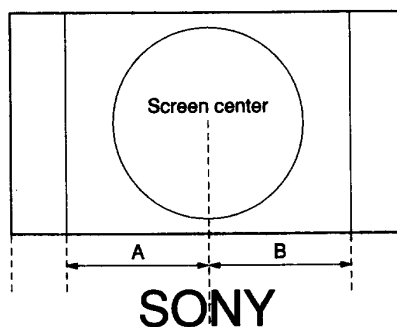
32" : A=46±5mm



5. Select PIN AMP (05), TILT (06), UC PIN (07) and LC PIN (08), and adjust the picture distortion.
6. Receive a NTSC signal to set to Service Mode.
7. Receive MONOSCOPE pattern. Repeat the adjustments from 3 to 5 above.

NORMAL MODE ADJUSTMENT (HWE)

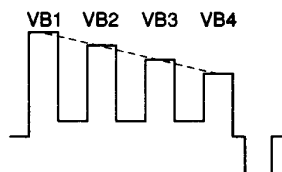
1. Receive a PAL monoscope to set to normal mode.
2. Set to Service Mode.
3. Select HWE (46) with the commander buttons **1** and **4**. With buttons **3** and **6**, adjust the picture center to bring it to the SONY logo badge center as in the figure.
4. Receive NTSC signal. Subtract 4 from the adjustment result of 3 above. With buttons **3** and **6**. Then write the data with **MUTING** → **0**.
5. Receive NTSC, MONOSCOPE pattern. Confirm that the picture center is on the same position as the SONY logo badge center as in the figure.



TWO PICTURE SUB HUH ADJUSTMENT (SH2)

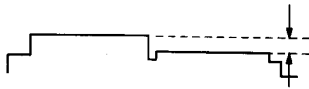
1. Receive a NTSC color-bar to set to TWIN 1.
2. Set the conditions as follows.

PICTURE	.....	80%
COLOR	.....	50%
HUE	.....	50%
3. Connect an oscilloscope to the pin ⑦ (B OUT) of CN508, D board.
4. Set to Service Mode.
5. Select 6D (SH2) with **1** and **4**, and adjust **3** and **6** to make the VB2 and VB3 levels come on the cross line between VB1 and VB4 as shown in the picture right.



TWO PICTURE SUB BRIGHT ADJUSTMENT (2SB)

1. Receive a NTSC all white to set to TWIN 1 mode.
2. Connect an oscilloscope to the pin ⑥ (R OUT) of CN508, D board.
3. Set to Service Mode.
4. Select 27 (2SB) with **[1]** and **[4]** and adjust **[3]** and **[6]** to get the same DC levels on the right and left pictures as shown in the figure.



4-7. PICTURE DISTORTION ADJUSTMENT

Item Numbers 00-0A

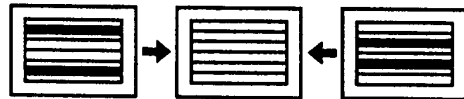
00 VSZ (V SIZE)



01 VSF (V SHIFT)



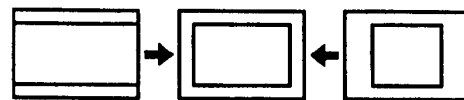
02 SCR (VERTICAL S correction)



03 VLN (V LINEARITY)



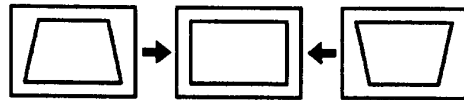
04 HSZ (H SIZE)



05 PAP (PIN AMP)



06 TLT (TILT)



07 UCP (Upper Corner Pin)

08 LCP (Lower Corner Pin)



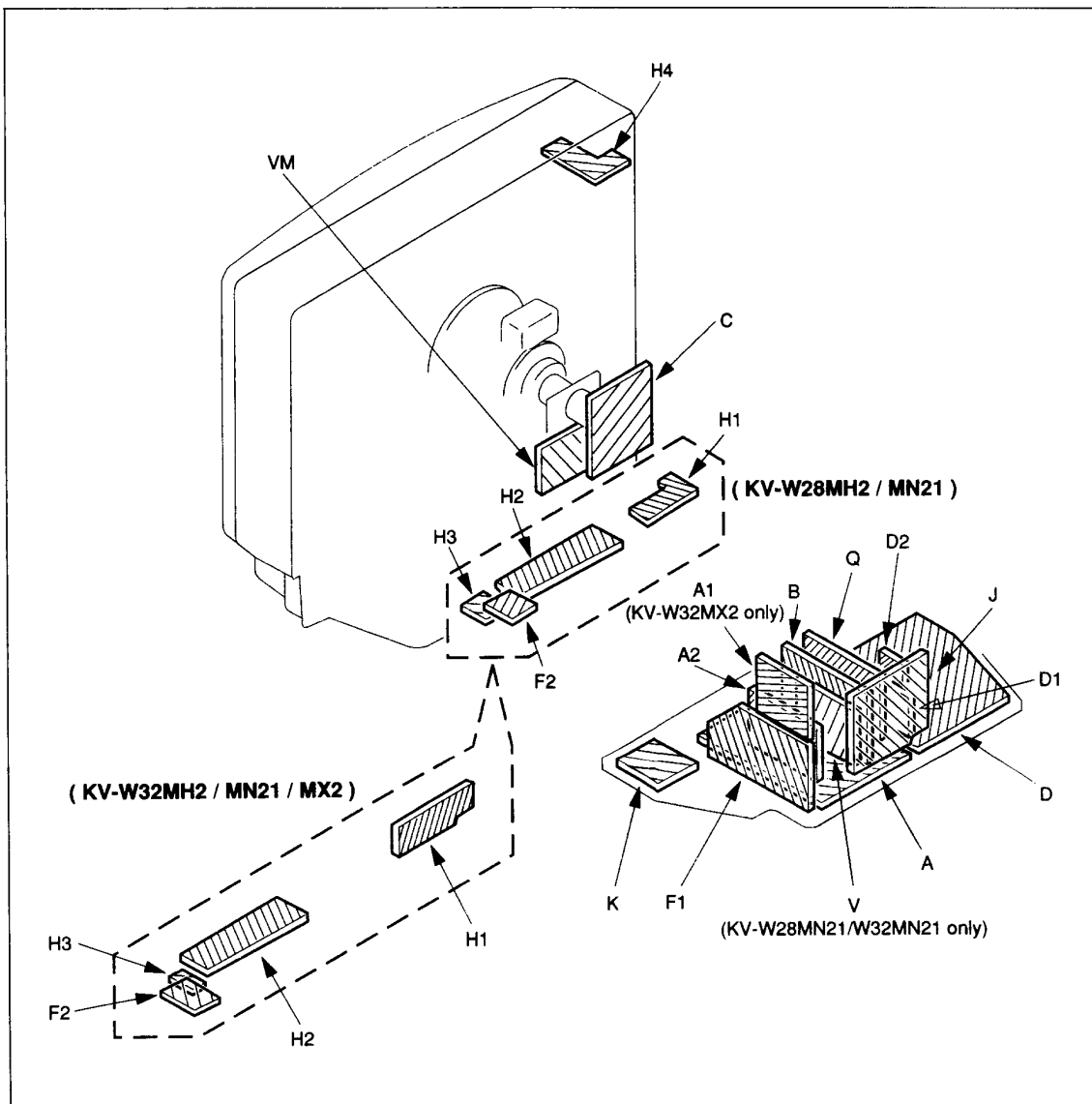
09 VBW (V-BOW)



0A VAG (V-ANGLE)



5-2. CIRCUIT BOARDS LOCATION



5-3. SCHEMATIC DIAGRAMS AND PRINTED WIRING BOARDS

Note:

- All capacitors are in μF unless otherwise noted. pF : μF 50 V or less are not indicated except for electrolytic.
- Indication of resistance, which does not have one for rating electrical power, is as follows.

Pitch: 5 mm
Rating electrical power 1/4W (CHIP: 1/10W)

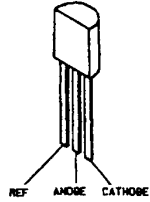
- All resistors are in ohms.
- : nonflammable resistor.
- : fusible resistor.
- Δ : internal component.
- : panel designation, or adjustment for repair.
- All variable and adjustable resistors have characteristic curve B, unless otherwise noted.
- $\perp$: earth-ground.

Reference Information

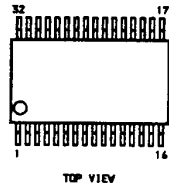
RESISTOR	: RN	METAL FILM
	: RC	SOLID
	: FPRD	NONFRAMMABLE CARBON
	: FUSE	NONFLAMMABLE FUSIBLE
	: RS	NONFLAMMABLE METAL OXIDE
	: RB	NONFLAMMABLE CEMENT
	: RW	NONFLAMMABLE WIREWOUND
COIL	: *	ADJUSTMENT RESISTOR
	: LF-8L	MICRO INDUCTOR
	: TA	TANTALUM
CAPACITOR	: PS	STYROL
	: PP	POLYPROPYLENE
	: PT	MYLAR
	: MPS	METALIZED POLYESTER
	: MPP	METALIZED POLYPROPYLENE

5-4. SEMICONDUCTORS

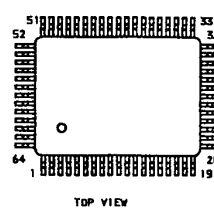
AN1431T



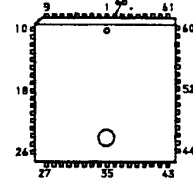
CXD1176Q
TDA8755T-T



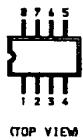
CXP5068H-239Q
CXP85452-009Q
CXP85452-010Q



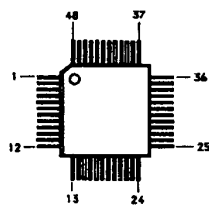
MSP3410
SAA7158WP-T



BA4558F
BA7046F
NJM2233BM
NJM2903M
NJM4558M-T2
μPC4558G2



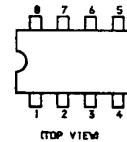
CXD1178Q
CXD2018Q



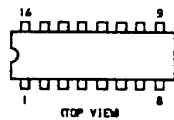
CX20125



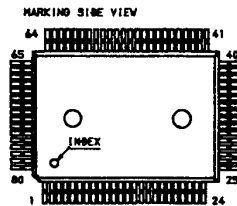
M5216P
NJM2903D
μPC358C
μPC358GR-E1
μPC4557C



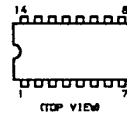
CXA1315P
CXA1526P
MC14052BCP
MC74F157AM



CXD2024AQ
SAA4940H-T



CA0007AD
IR2112
LM324N
μPC324C
X24164SIC7000



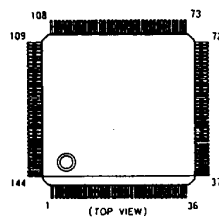
NJM78L05A
NJM78L08A



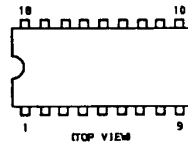
CXA1855S



CXD2031R



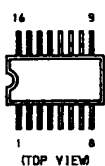
LA7856A
MC33025P
TDA2579B



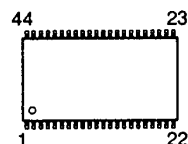
NJM78M08FA
NJM78M09FA
NJM7809FA



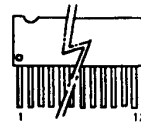
CXD1172AM
HD14053BFP
HEF4046BT-T
MC14040BF
MC14046BDWR2
MC14046BF
MC14053BF
MC74F163AM
MC74F174M
MC74F175M
MC74HC4053F
SN74LS157NS
TDA4665T-T
μPD74HC4538G



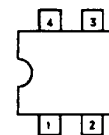
CXK1206ATM



MB81C1000A-80PSZ



PC123F2



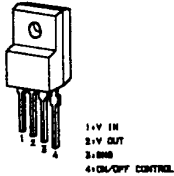
MC14001BF
MC14081BF
MC74F00M
MC74F08M
MC74F74M
SN74HC14ANS



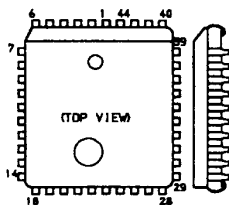
1. VCC
2. MC
3. V_{out}
4. GND

KV-W28MH2/W28MN21
KV-W32MH2/W32MN21/W32MX2
RM-890

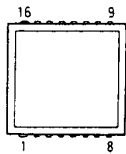
PQ05RF21
PQ12RE11
PQ12RF21



P83C652FBA-V3/AB517
SAA4951WP/V1-T
TPU3040TE-L



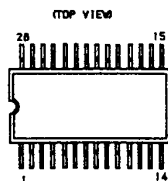
SBX1637A-02



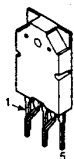
SBX-1790-11



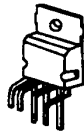
SDA9187-2XGEG
SDA9188-3XGEG
μPD6456GS-640-E2



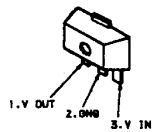
STR-81159A



STV9379



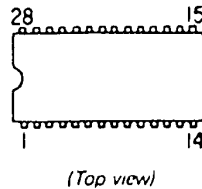
S-80743AL-A7-S



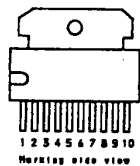
TC4S66F
TC7566F



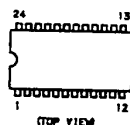
TDA4686/V1



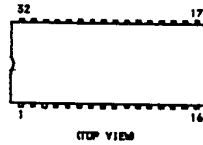
TDA7265



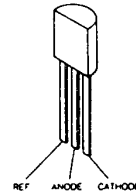
TDA8443B
TDA9145/N3D



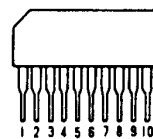
TDA9160A



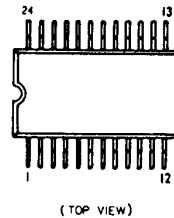
TL431CLP



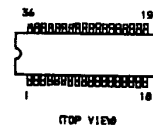
μPC1406HA



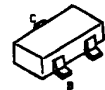
μPD42102G-3



ZA2970-26DTR



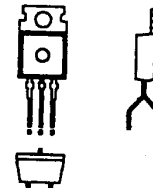
BF550
DTA114EK
DTA114TK
DTC114EK
DTC144EK
2SA1037K
2SA1162G
2SC1623
2SC2412K
2SC2412K-QR
2SC2712-YG



DTC114ES
DTC144ES
2SC2603



IRFIBC30G-LF



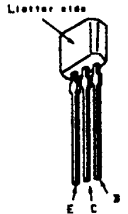
IRF614
2SA1837
2SD2012



2SA1091
2SC2551



2SA1175-HFE
2SA1309A
2SC2785-HFE
2SC3311A



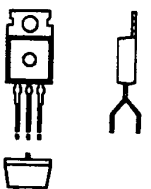
2SB734-34
2SC3733
2SD774-34



2SC2611
2SC2688-LK
2SC3840K



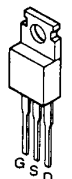
2SC3997-YB



2SC4783
2SK940

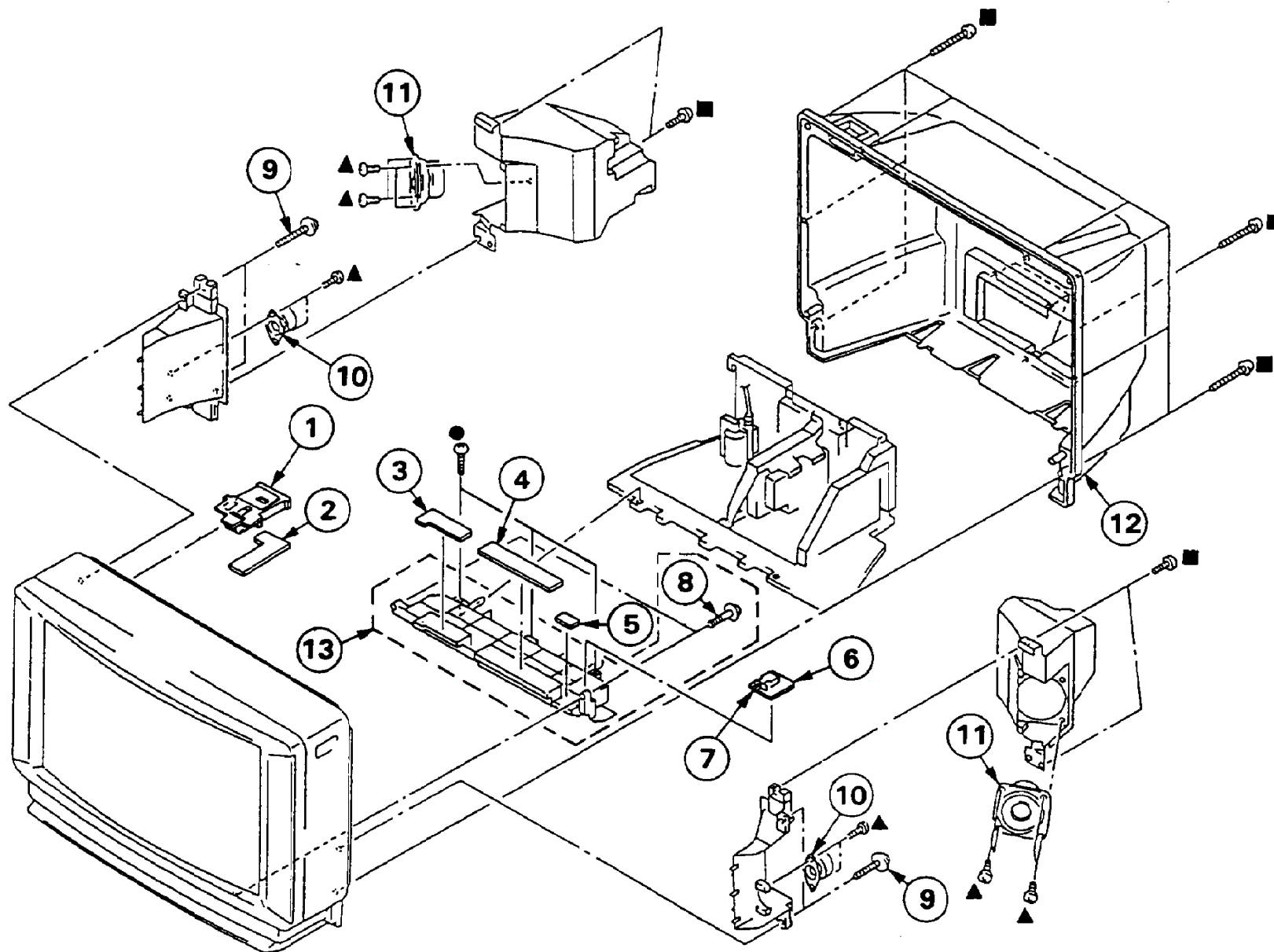


2SD2394



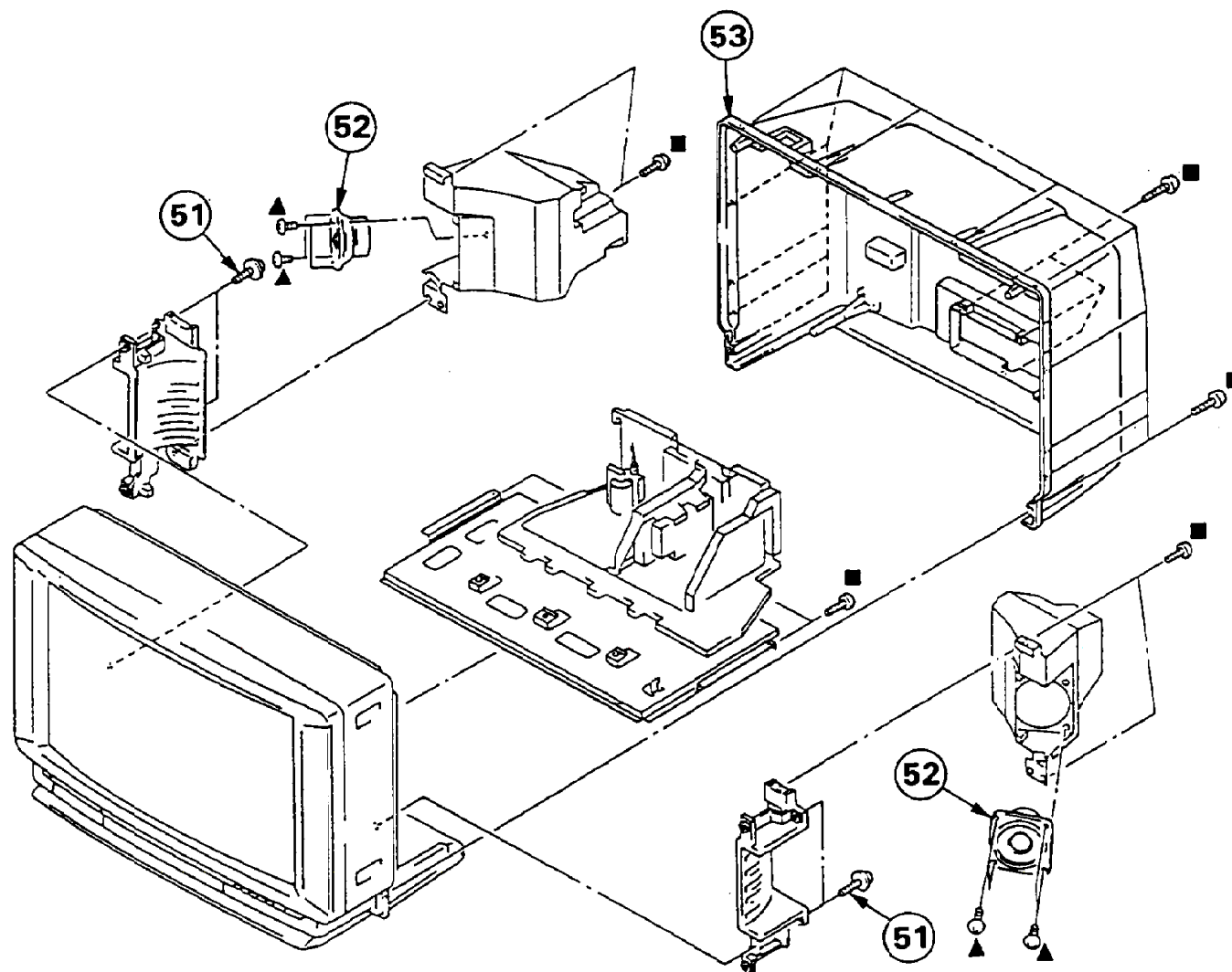
6-1. REAR COVER AND SPEAKER (KV-W28MH2/W28MN21)

- : +BVTP 3 × 12 7-685-648-79
- ▲: +BVTP 4 × 12 7-685-661-14
- : +BVTP 4 × 16 7-685-663-79



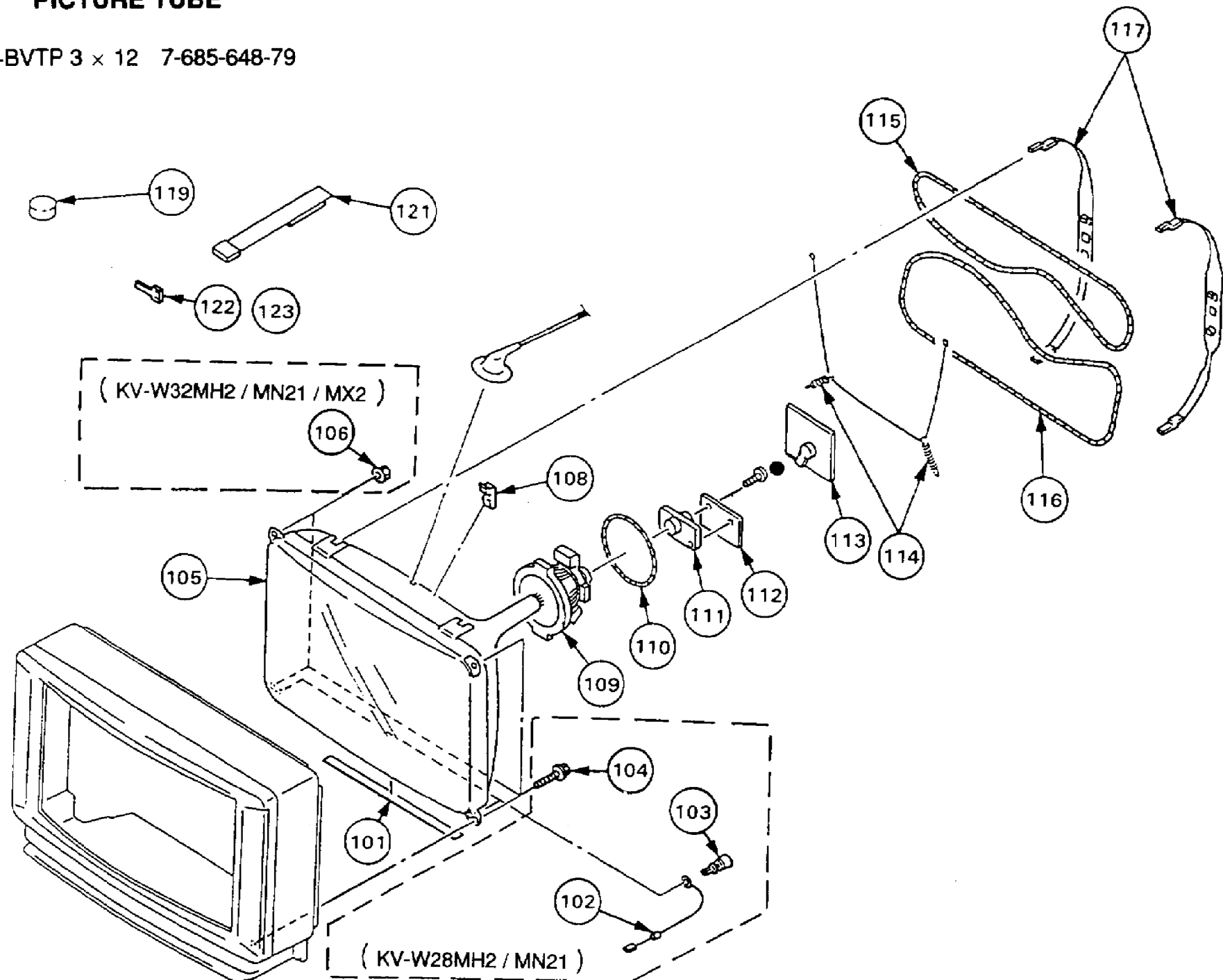
6-2. REAR COVER AND SPEAKER (KV-W32MH2/W32MN21/W32MX2)

■: +BVTP 4 × 16 7-685-663-79
▲: +BVTP 4 × 12 7-685-661-14



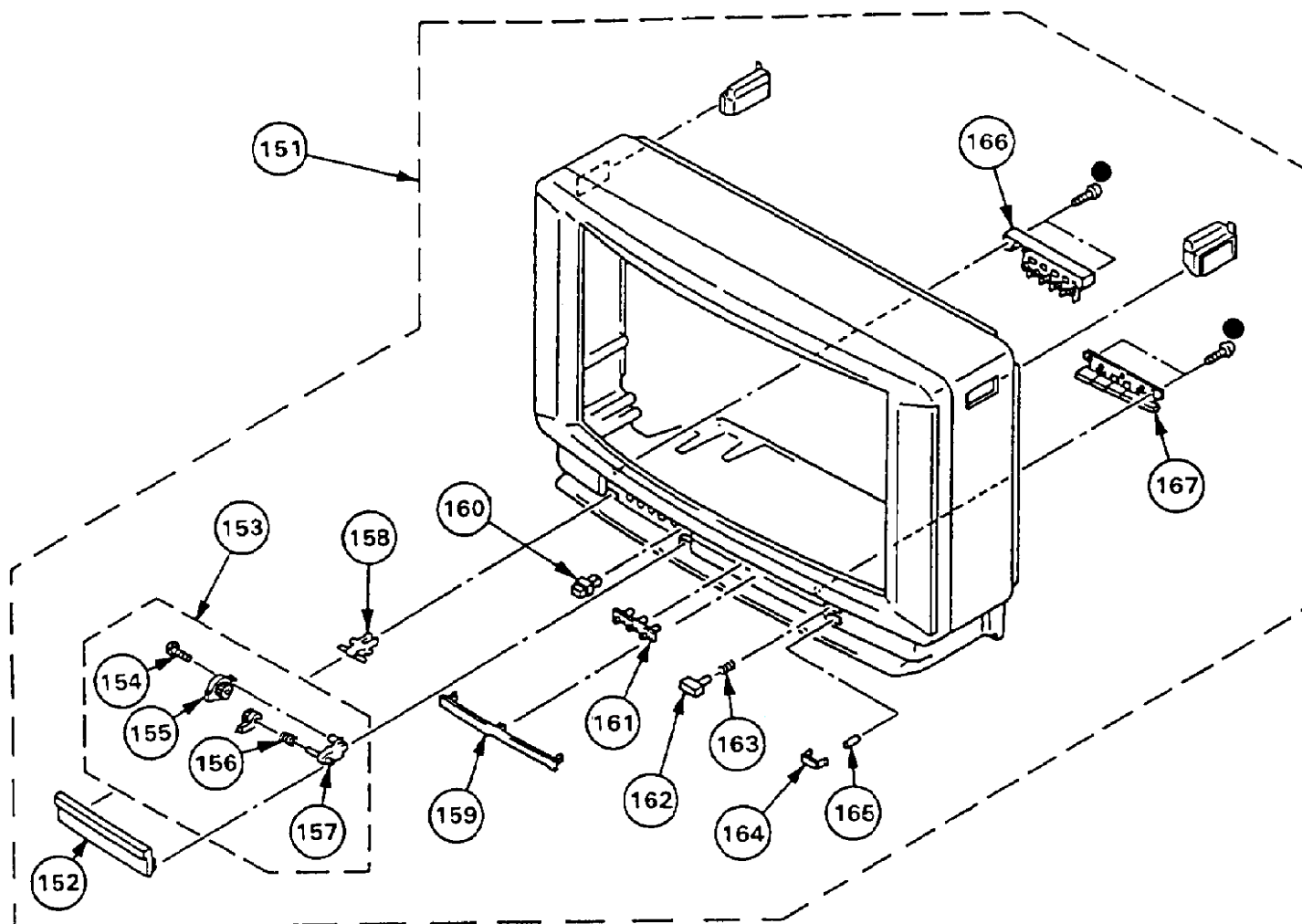
6-3. PICTURE TUBE

●: +BVTP 3 × 12 7-685-648-79



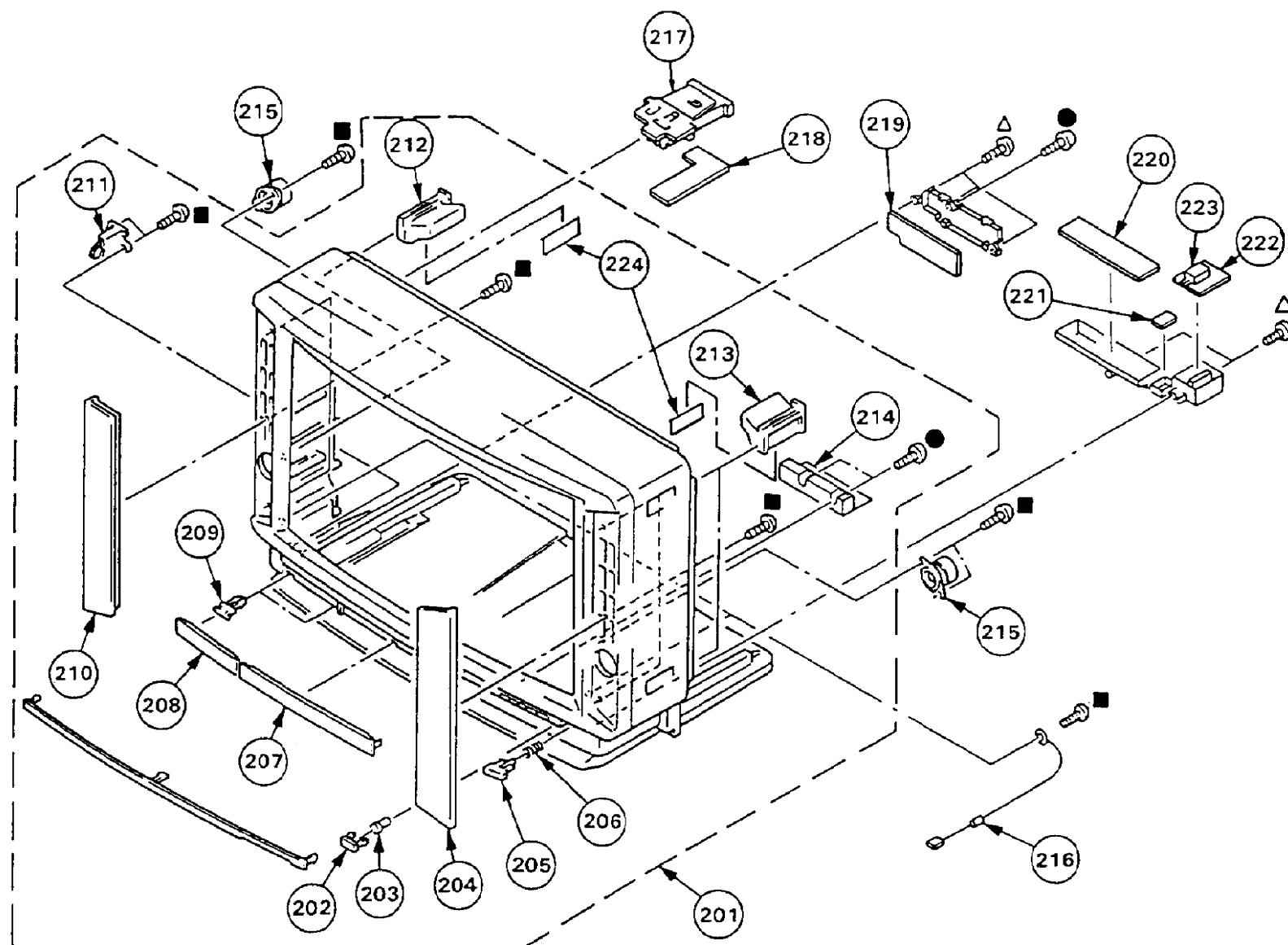
6-4. CABINET (WITH BEZEL)
(KV-W28MH2/W28MN21)

●: +BVTP 3 × 12 7-685-648-79



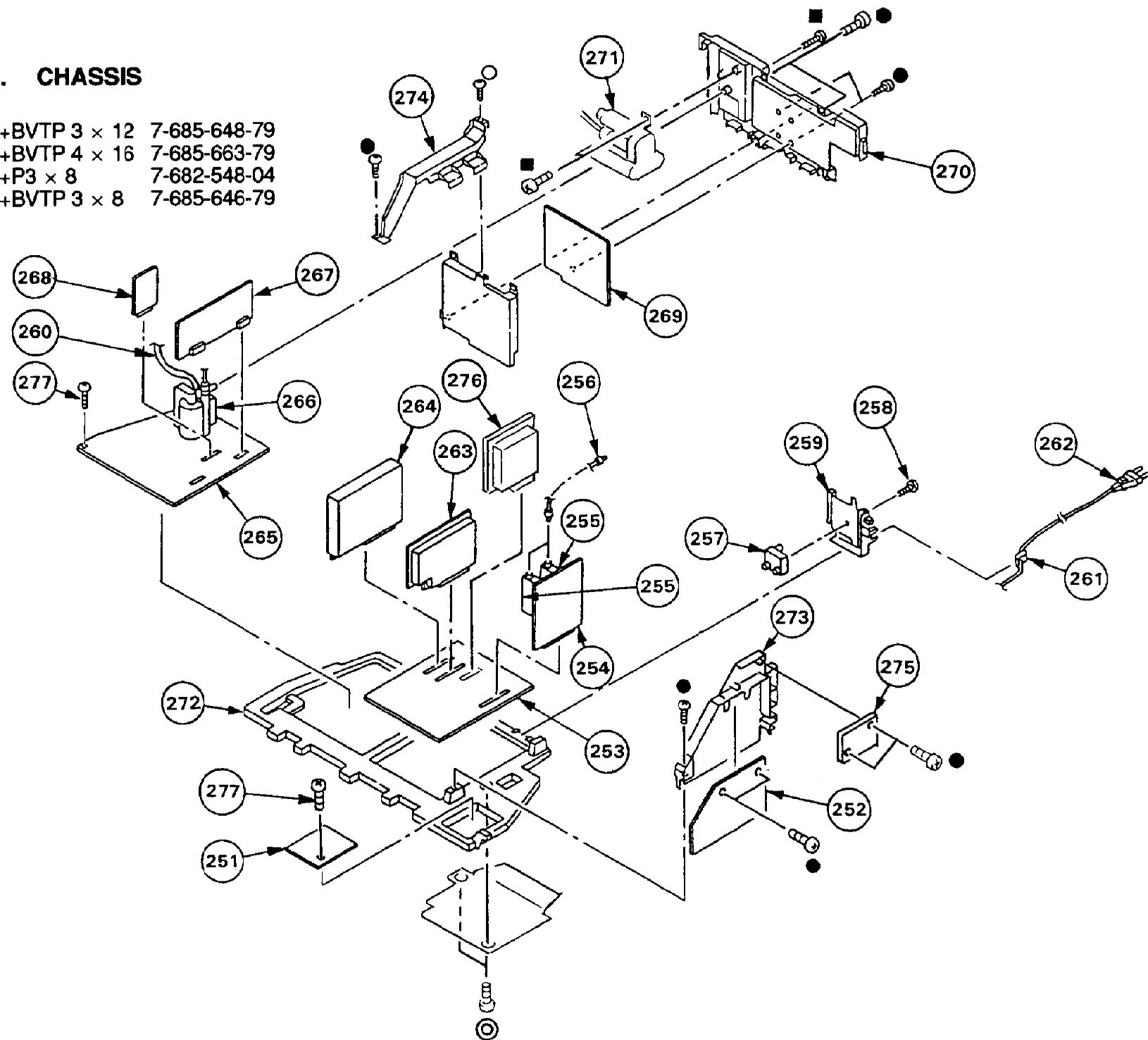
6-5. CABINET (WITH BEZEL) **(KV-W32MH2/W32MN21/W32MX2)**

- : +BVTP 3 × 12 7-685-648-79
- : +BVTP 4 × 16 7-685-663-79
- △: +BV 3 × 25 7-685-152-19

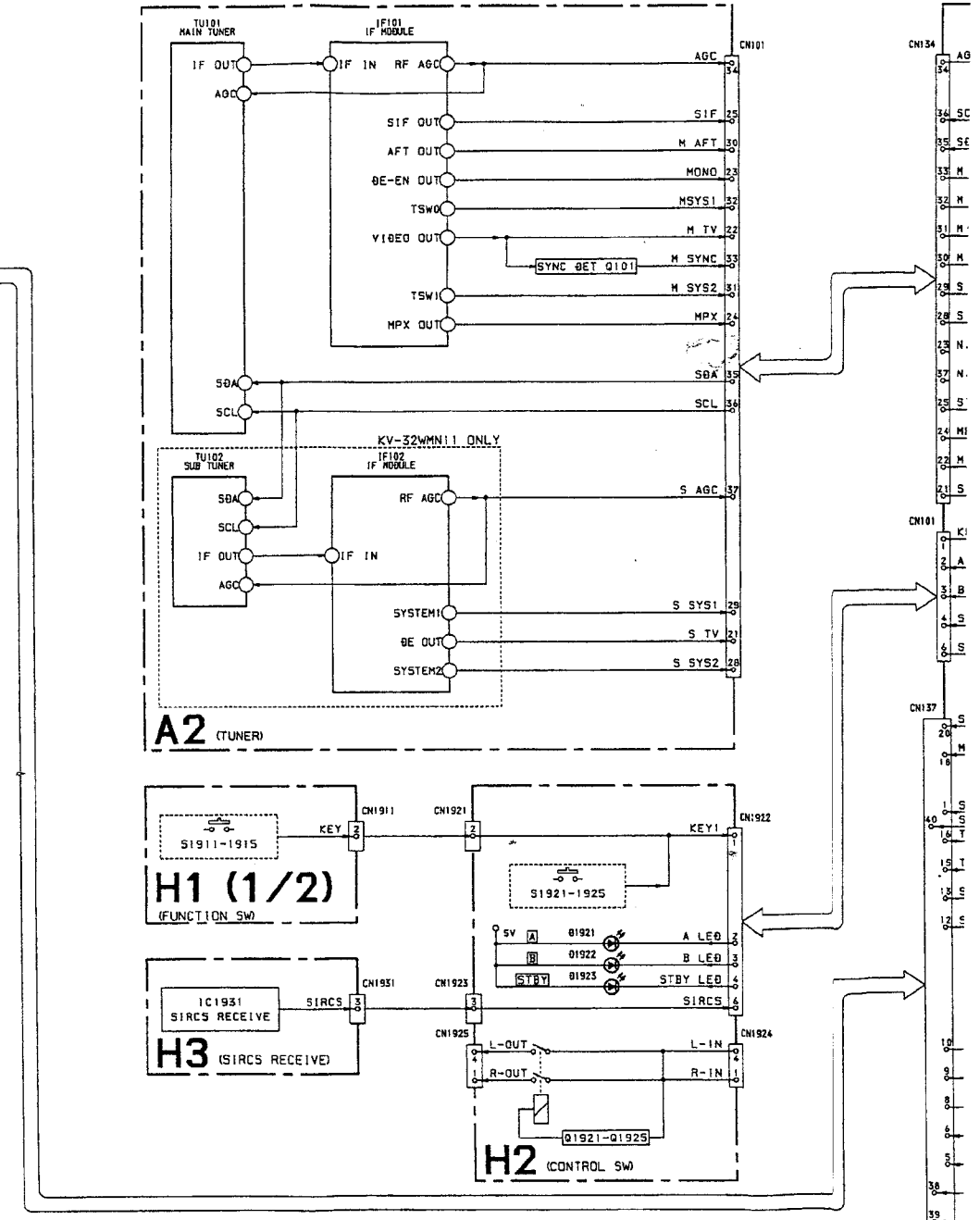
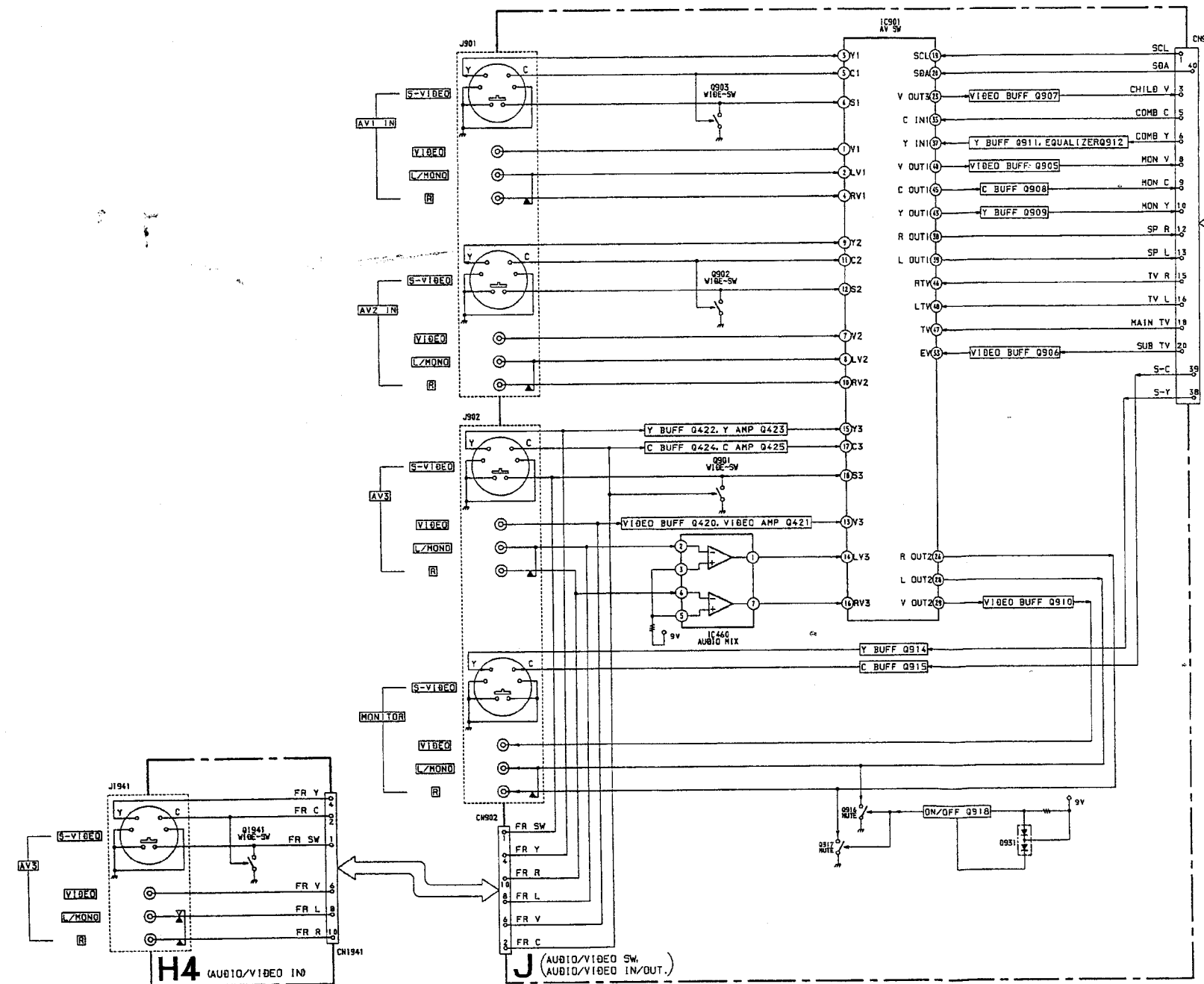


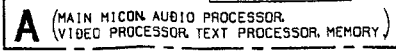
6-6. CHASSIS

- : +BVTP 3 × 12 7-685-648-79
- : +BVTP 4 × 16 7-685-663-79
- : +P3 × 8 7-682-548-04
- ◎: +BVTP 3 × 8 7-685-646-79



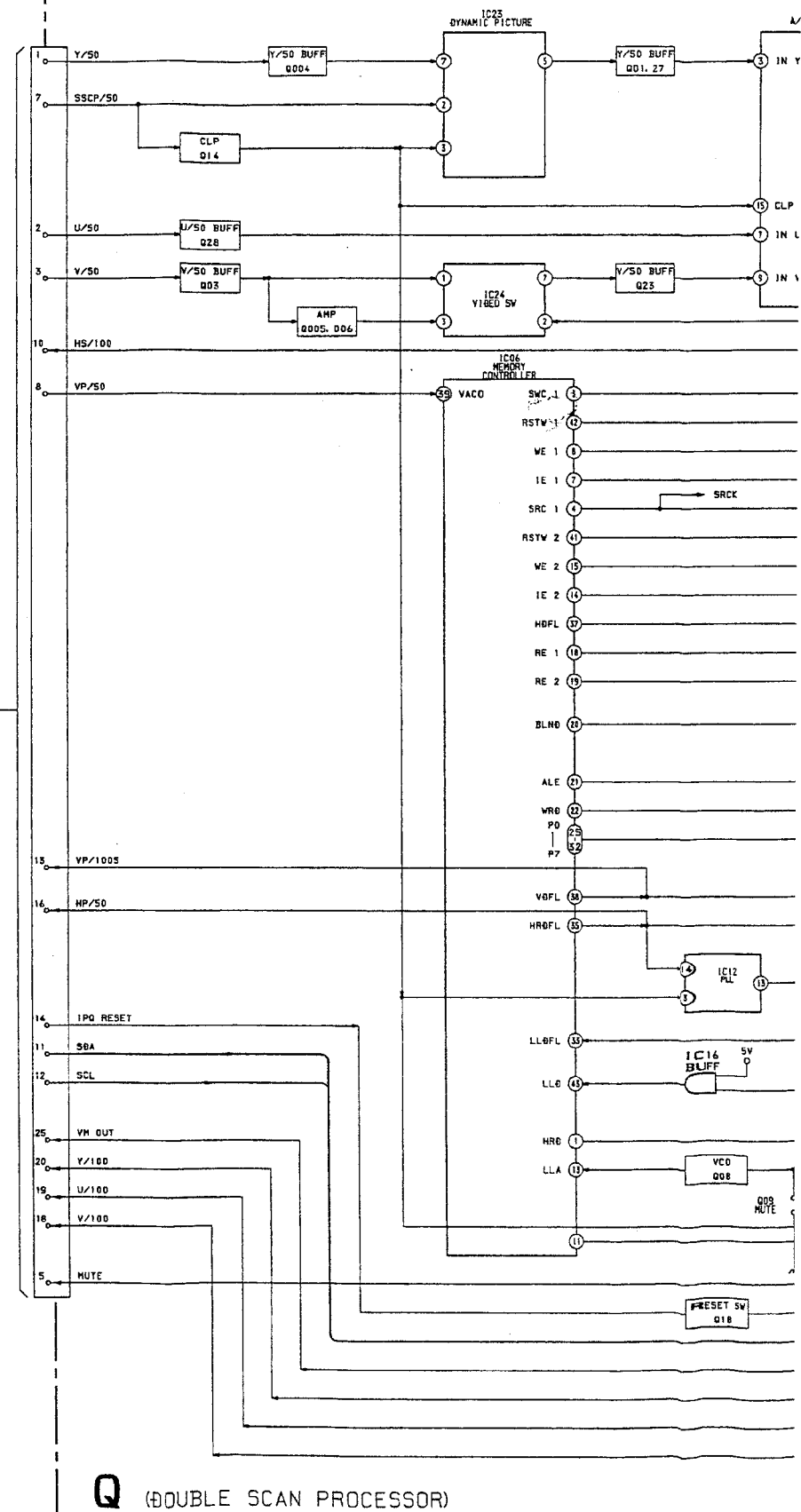
5-1. BLOCK DIAGRAM (1)

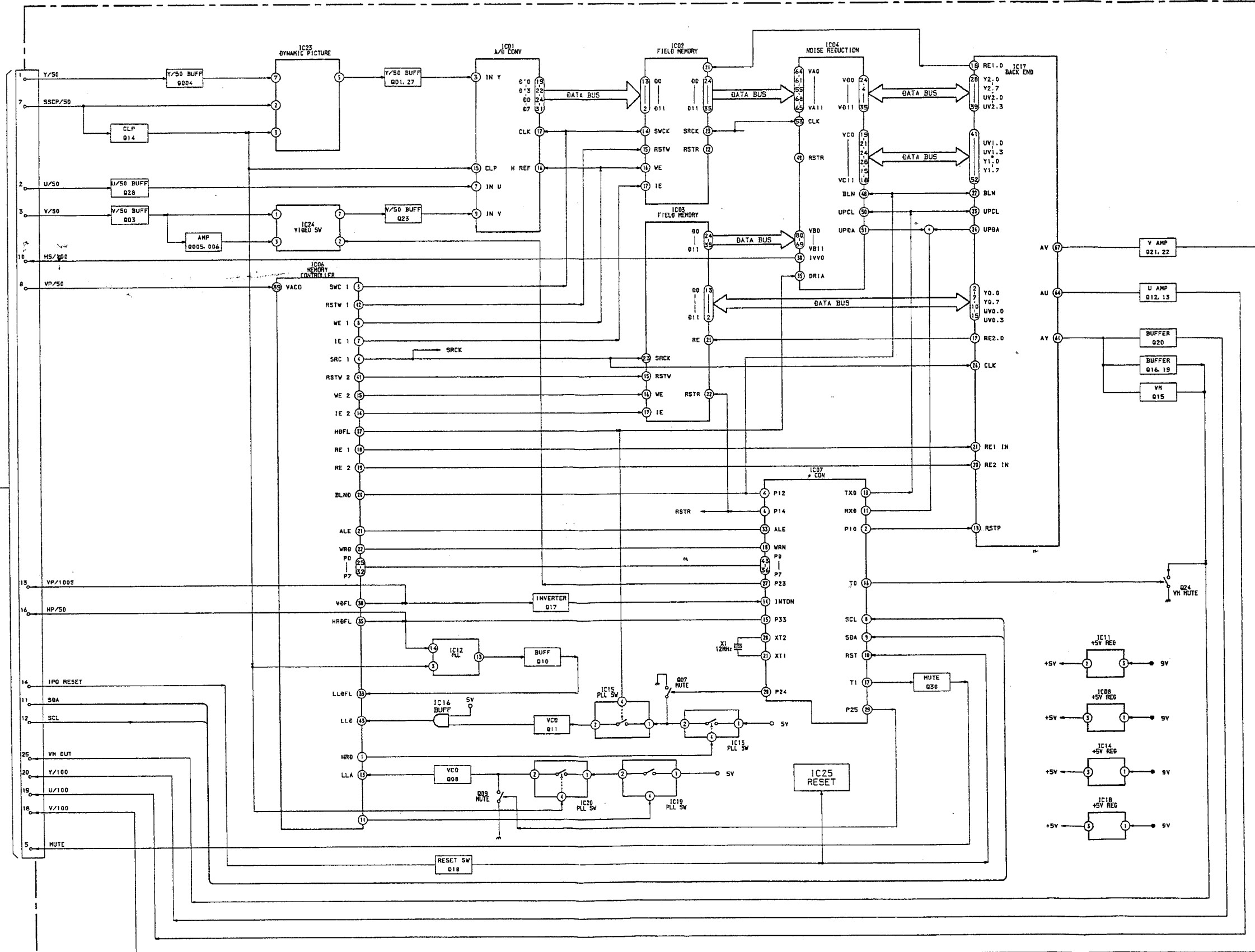




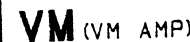
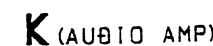


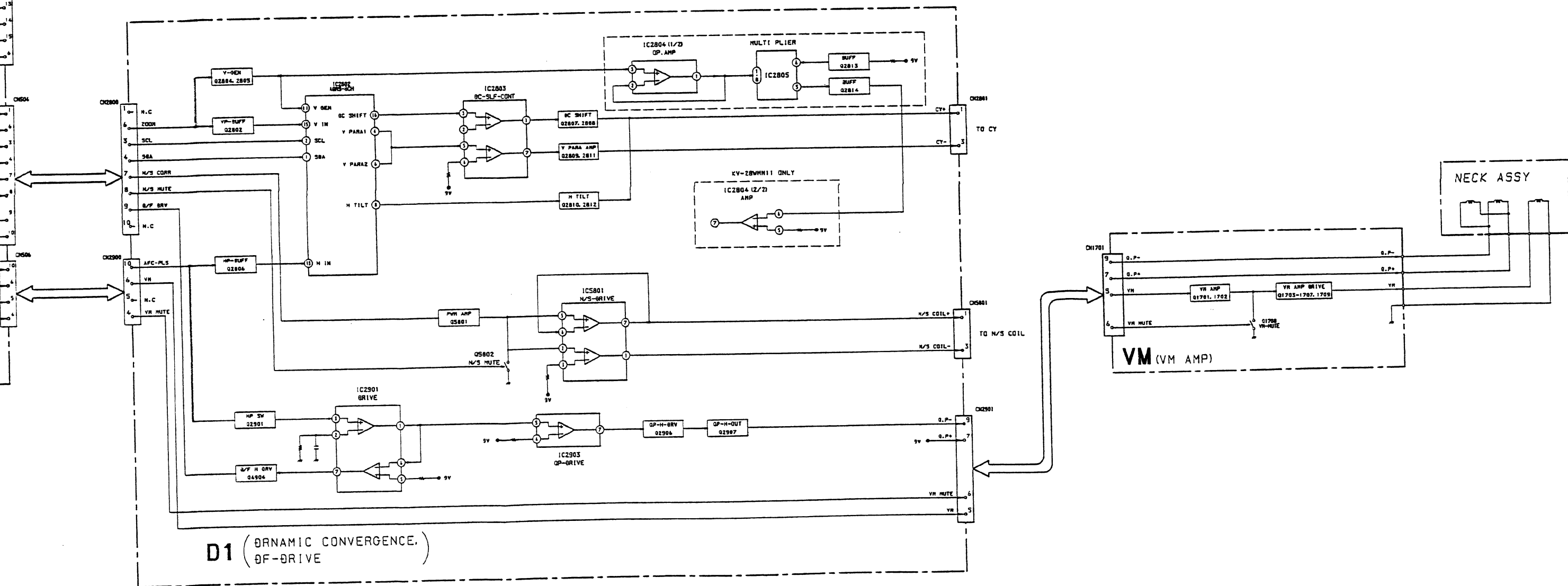
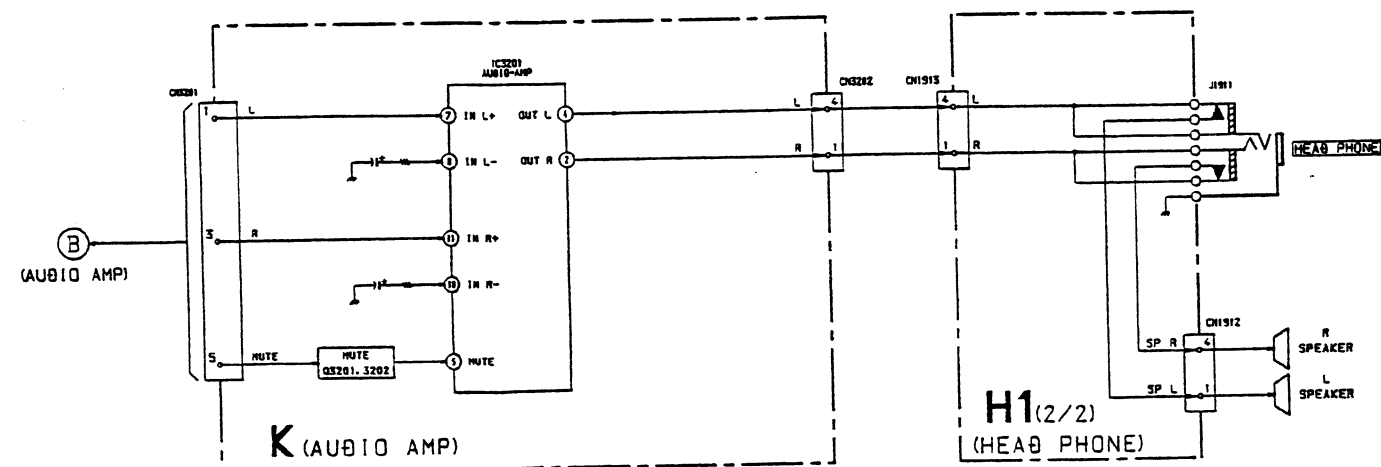
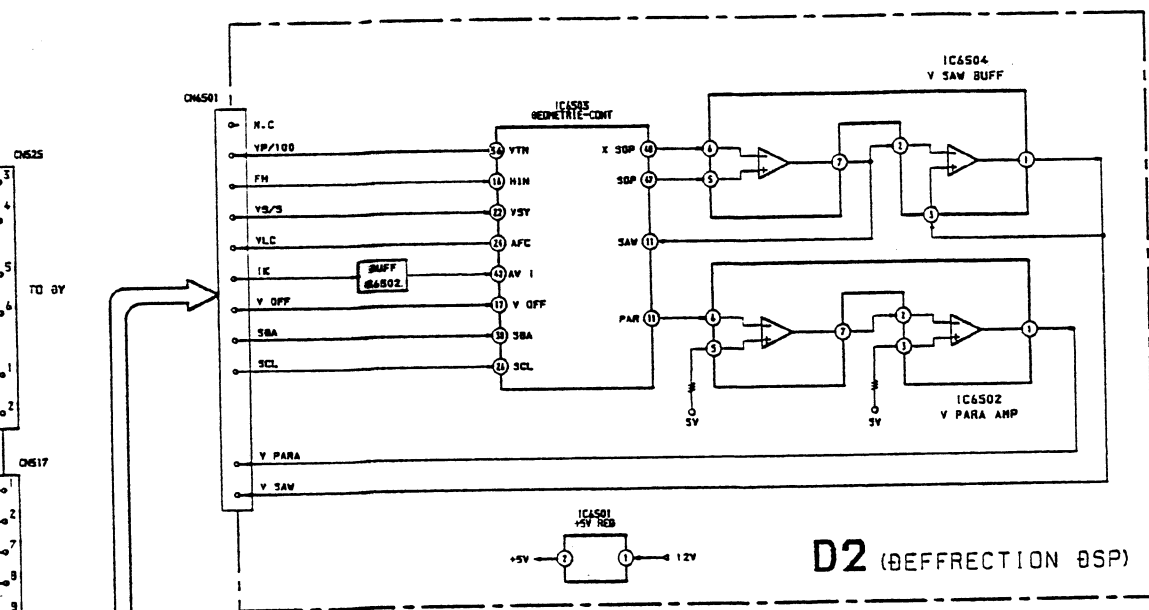
(CHROMA RECORDER, 1H DELAY,)
(P 1NP.30-Y/C-SEP, R.G.B SW)



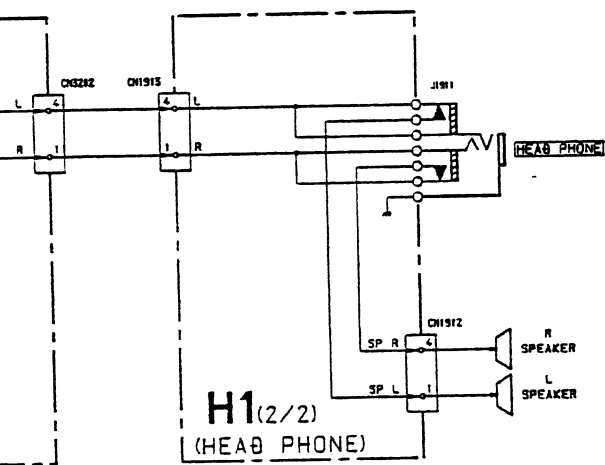
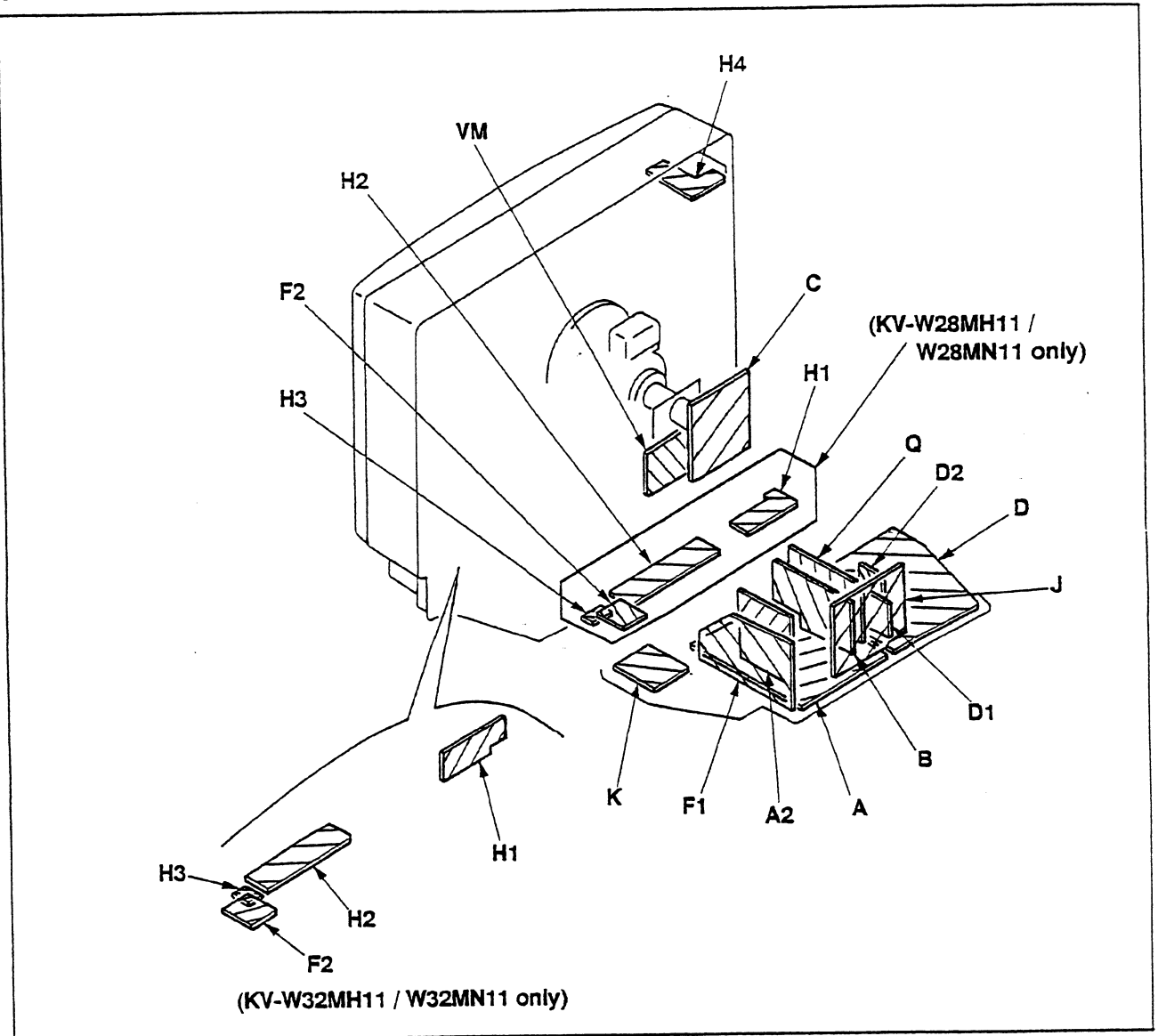


— 41 —





5-2. CIRCUIT BOARDS LOCATION



5-3. PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAMS

Note:

- All capacitors are in μF unless otherwise noted. pF : μF 50V or less are not indicated except for electrolytics and tantalums.
- All electrolytics are in 50V unless otherwise specified.
- All resistors are in ohms.
 $\text{k}\Omega = 1000\Omega$. $\text{M}\Omega = 1000\text{k}\Omega$
- Indication of resistance, which does not have one for rating electrical power, is as follows.

Pitch: 5mm
Rating electrical power: $\frac{1}{4}\text{W}$

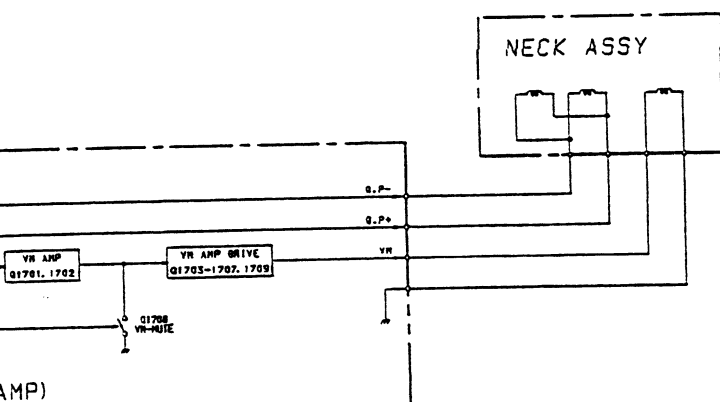
- : nonflammable resistor.
- : fusible resistor.
- Δ : internal component.
- : panel designation and adjustment for repair.
- All variable and adjustable resistors have characteristic curve B, unless otherwise noted.
- $\perp$: earth-ground.
- : earth-chassis.

- Readings are taken with a color-bar signal input.
- Readings are taken with a $10\text{M}\Omega$ digital multimeter.
- Voltages are dc with respect to ground unless otherwise noted.
- Voltage variations may be noted due to normal production tolerances.
- All voltages are in V.
- * : Measurement impossibility.
- : B + line.
- : B - line.
- (Actual measured value may be different).
- : signal path.(RF)
- Circled numbers are waveform references.
- No mark : with PAL color-bar signal received or common voltage.
- () : with SECAM color-bar signal received.
- { } : with NTSC 3.58 color-bar signal received.
- [] : with NTSC 4.43 color-bar signal received.

Reference information

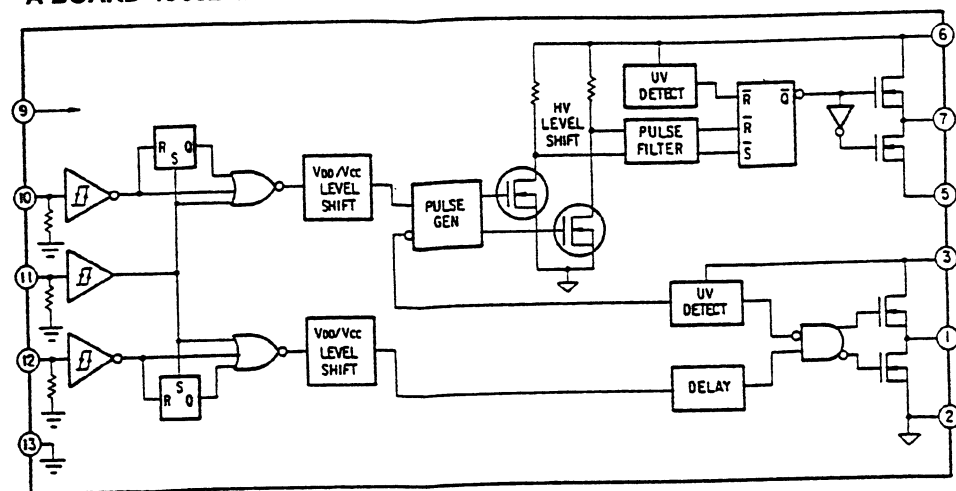
RESISTOR	: RN	METAL FILM
	: RC	SOLID
	: FPRD	NONFLAMMABLE CARBON
	: FUSE	NONFLAMMABLE FUSIBLE
	: RW	NONFLAMMABLE WIREWOUND
	: RS	NONFLAMMABLE METAL OXIDE
	: RB	NONFLAMMABLE CEMENT
	: *	ADJUSTMENT RESISTOR
COIL	: LF-8L	MICRO INDUCTOR
CAPACITOR	: TA	TANTALUM
	: PS	STYROL
	: PP	POLYPROPYLENE
	: PT	MYLAR
	: MPS	METALIZED POLYESTER
	: MPP	METALIZED POLYPROPYLENE
	: ALB	BIPOLAR
	: ALT	HIGH TEMPERATURE
	: ALR	HIGH RIPPLE

Note: The components identified by shading and mark Δ are critical for safety. Replace only with part number specified.

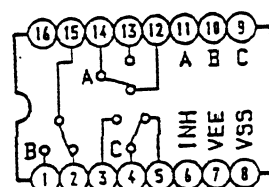


Schematic diagram

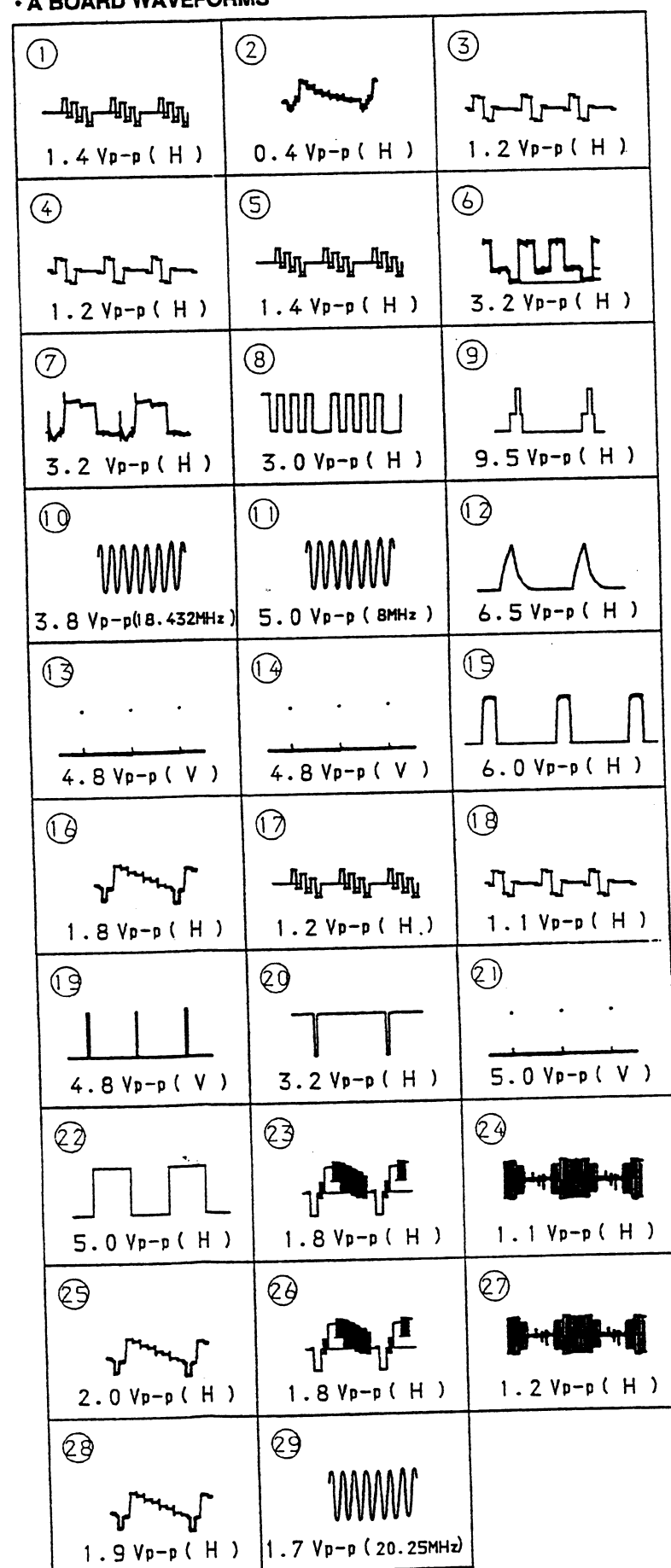
A BOARD IC602 IR2112

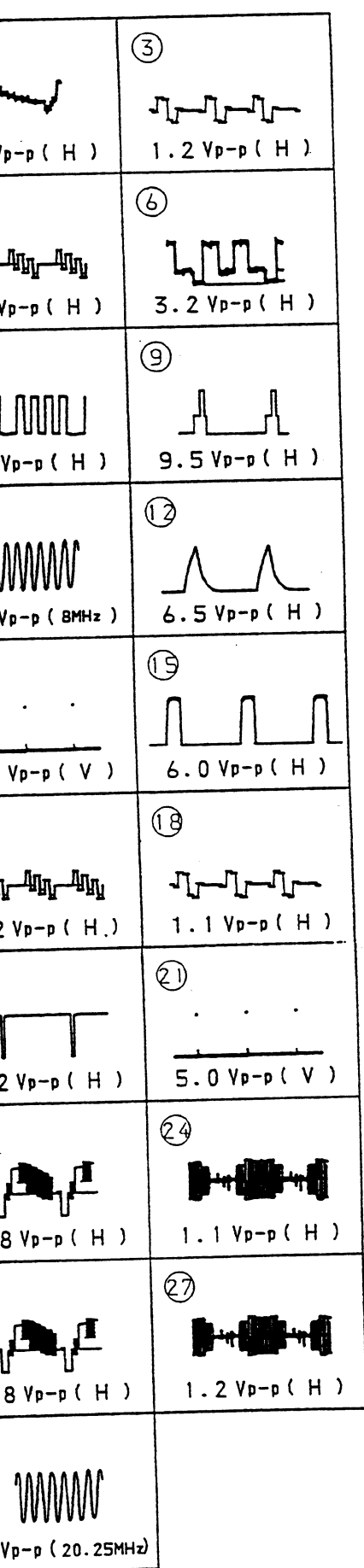


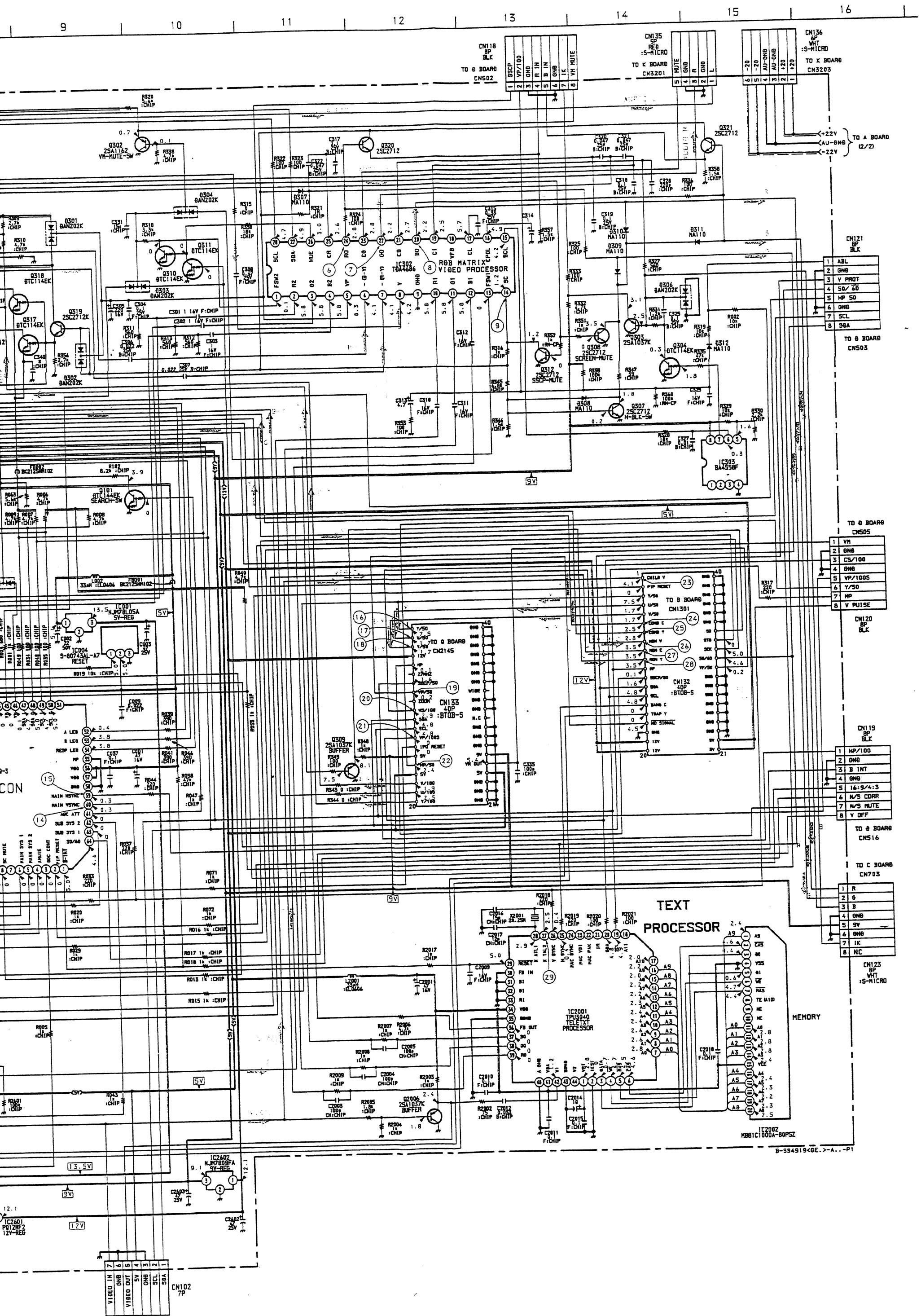
A BOARD IC301 MC14053BF



• A BOARD WAVEFORMS

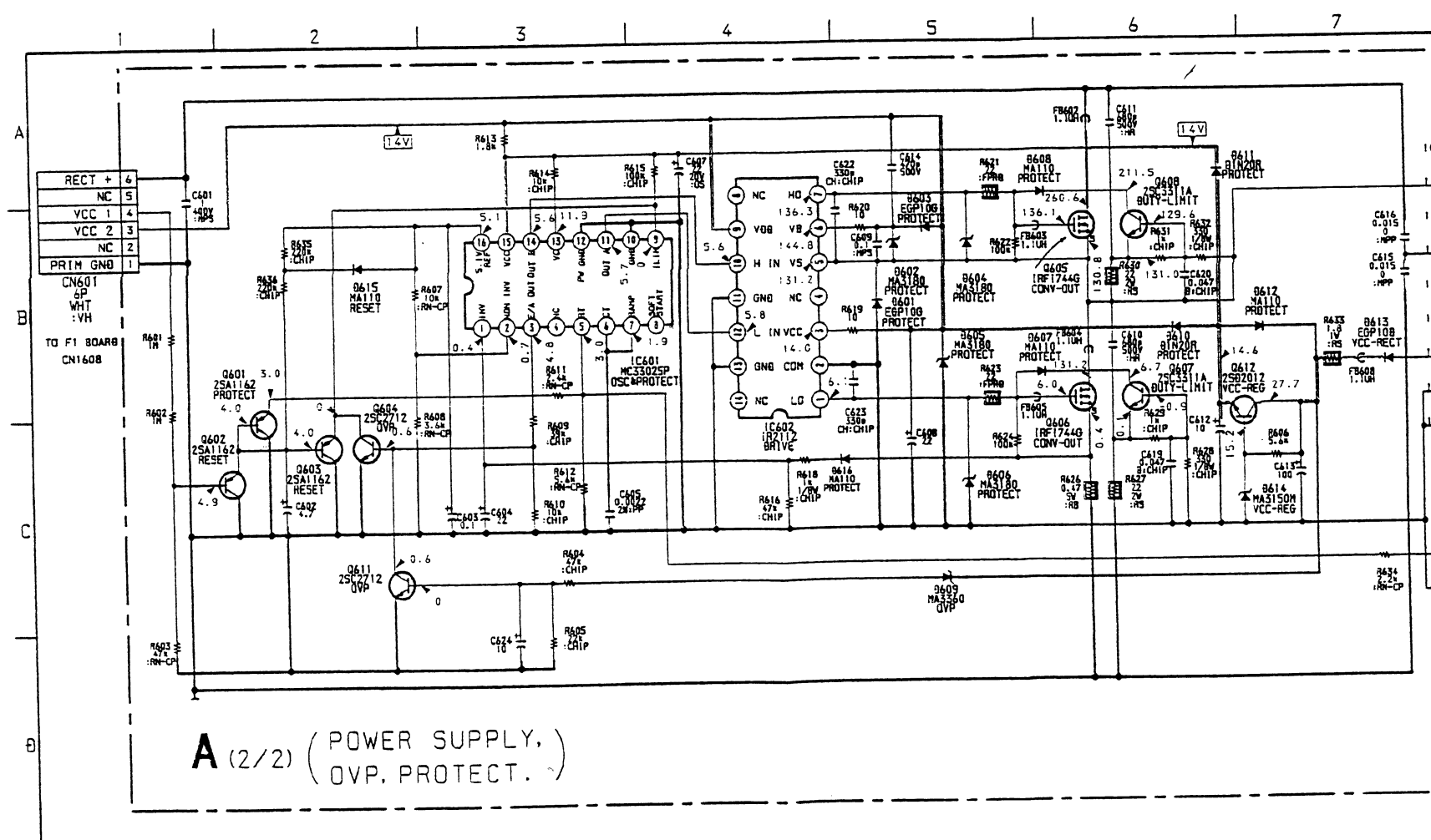
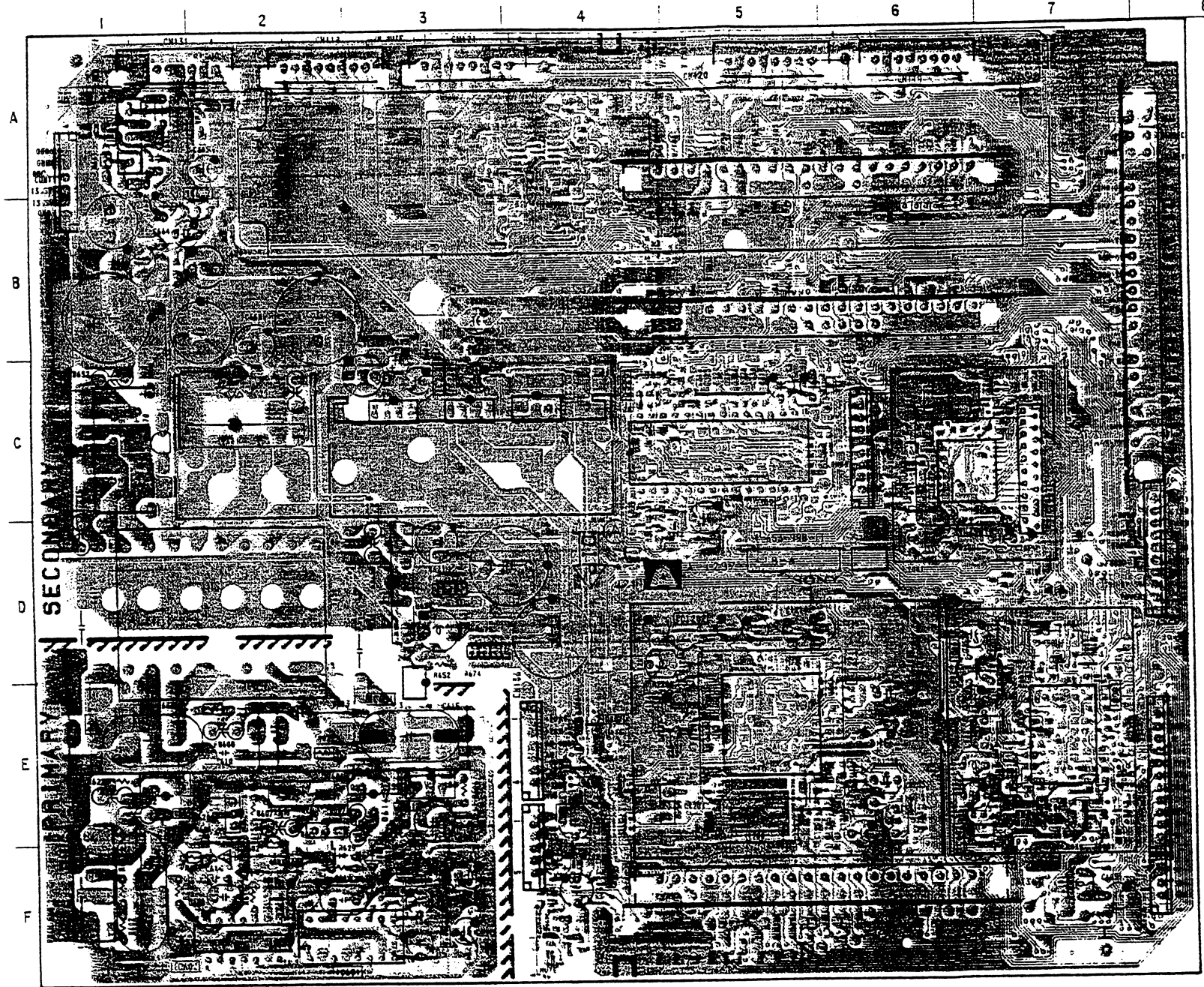






A SOUND DECODE & PROCESSOR,
VIDEO PROCESSOR, MAIN μ CON,
RGB MATRIX, TEXT PROCESSOR,
POWER SUPPLY, OVP

- A BOARD -



Note :

- : Pattern from the side which enables seeing.
- : Pattern of the rear side.

A BOARD

IC

IC001	D-6,
	D-9
IC002	E-6
IC003	E-7
IC004	
IC301	A-12
IC302	C-5
IC303	C-11
IC601	F-2,
	F-14
IC602	F-2,
	F-14
IC650	A-1,
	A-15
IC651	E-3,
	E-13
IC652	B-2,
	B-14
IC1201	E-5
IC1202	D-5,
	D-11
IC2001	C-6
IC2002	C-7,
	C-9
IC2601	C-3,
	C-13
IC2602	C-4,
	C-12
IC2603	C-3,
	C-13

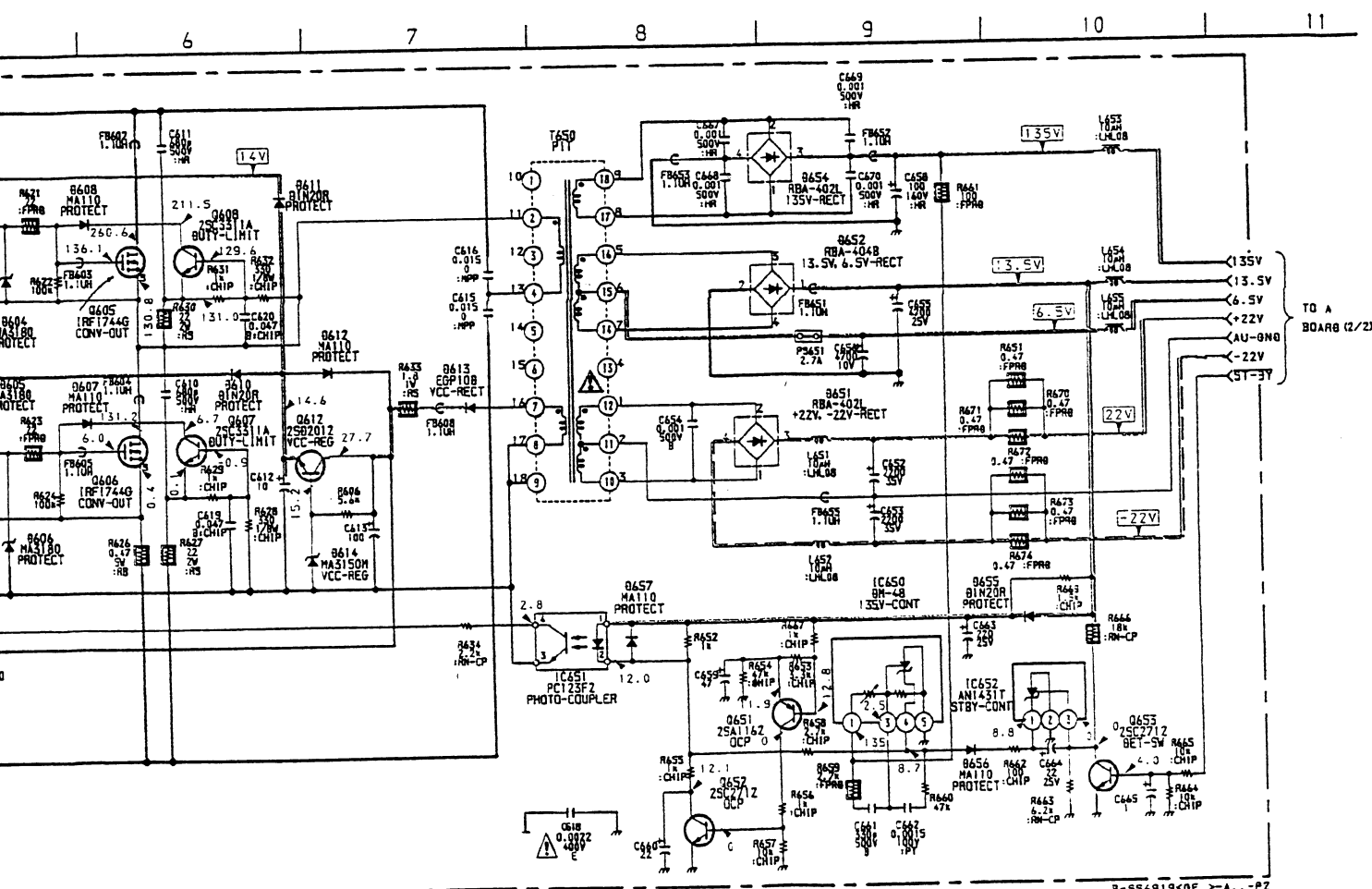
TRANSISTOR

Q101	E-9
Q203	F-12
Q204	F-12
Q301	A-13
Q302	C-11
Q303	C-10
Q304	C-11
Q305	A-12
Q306	A-12
Q307	E-4
Q308	E-4



NOTE:

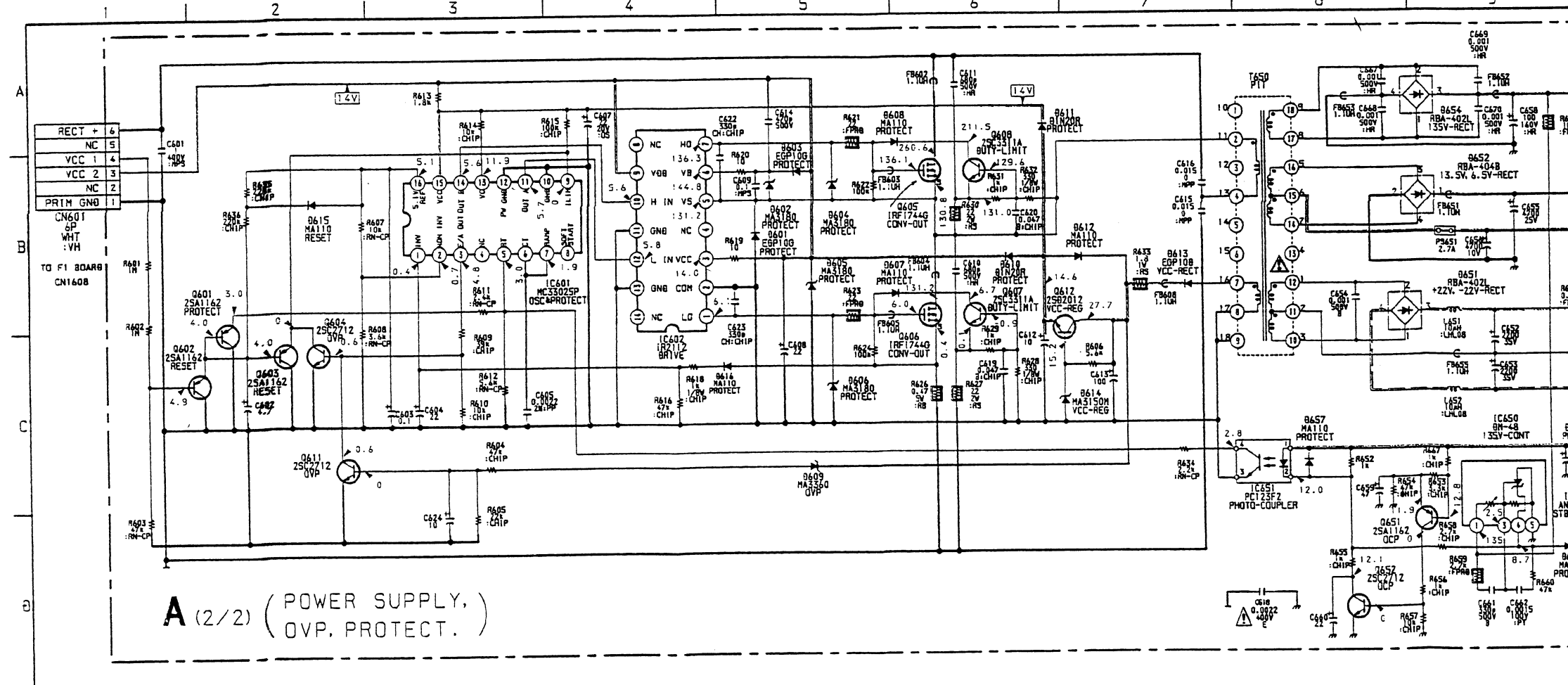
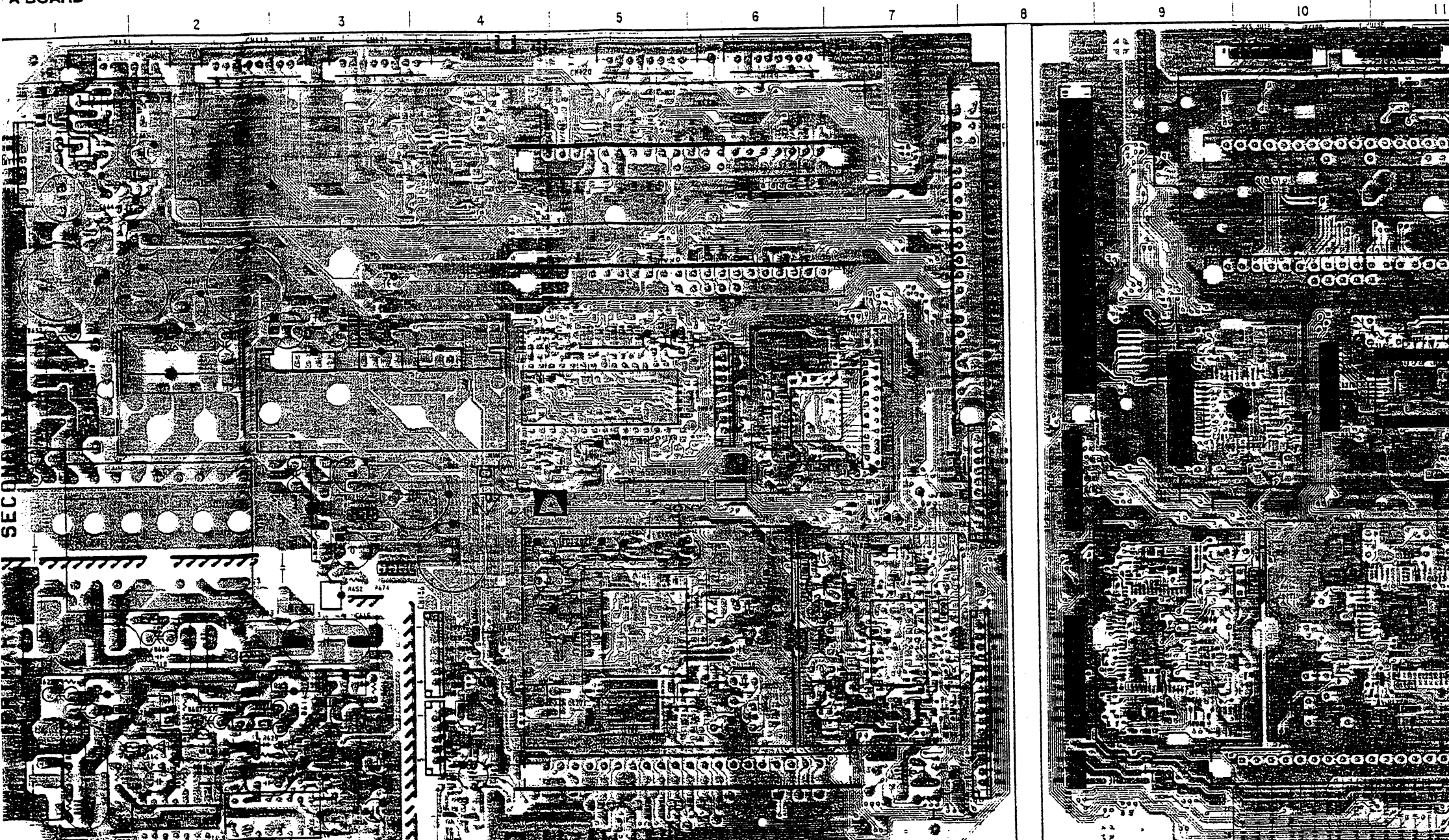
The circuit indicated as left contains high voltage of over 600 Vp-p. Care must be paid to prevent an electric shock in inspection or repairing.



Schematic diagram

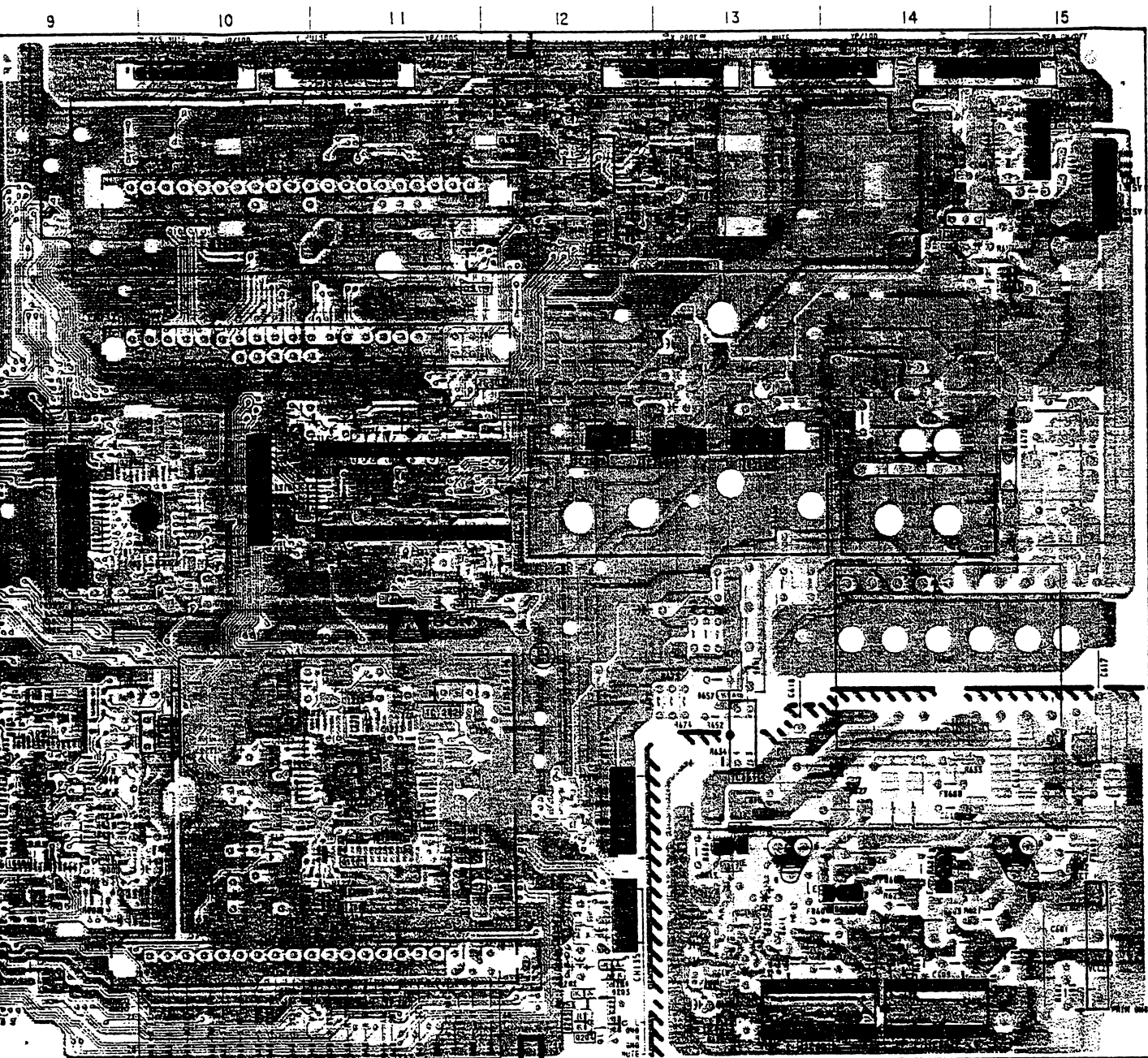
A SOUND DECODE & PROCESSOR,
VIDEO PROCESSOR, MAIN μ CON,
RGB MATRIX, TEXT PROCESSOR,
POWER SUPPLY, OVP

A BOARD -



Note :

- : Pattern from the side which enables seeing.
- : Pattern of the rear side.

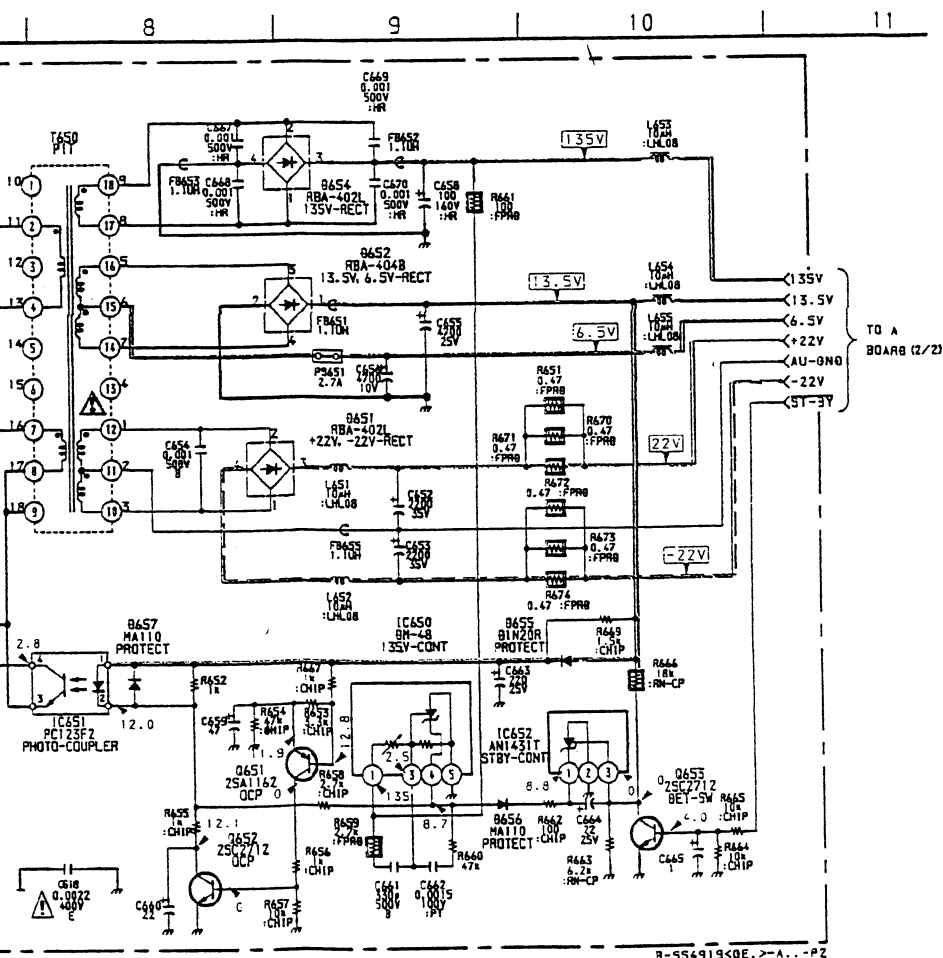


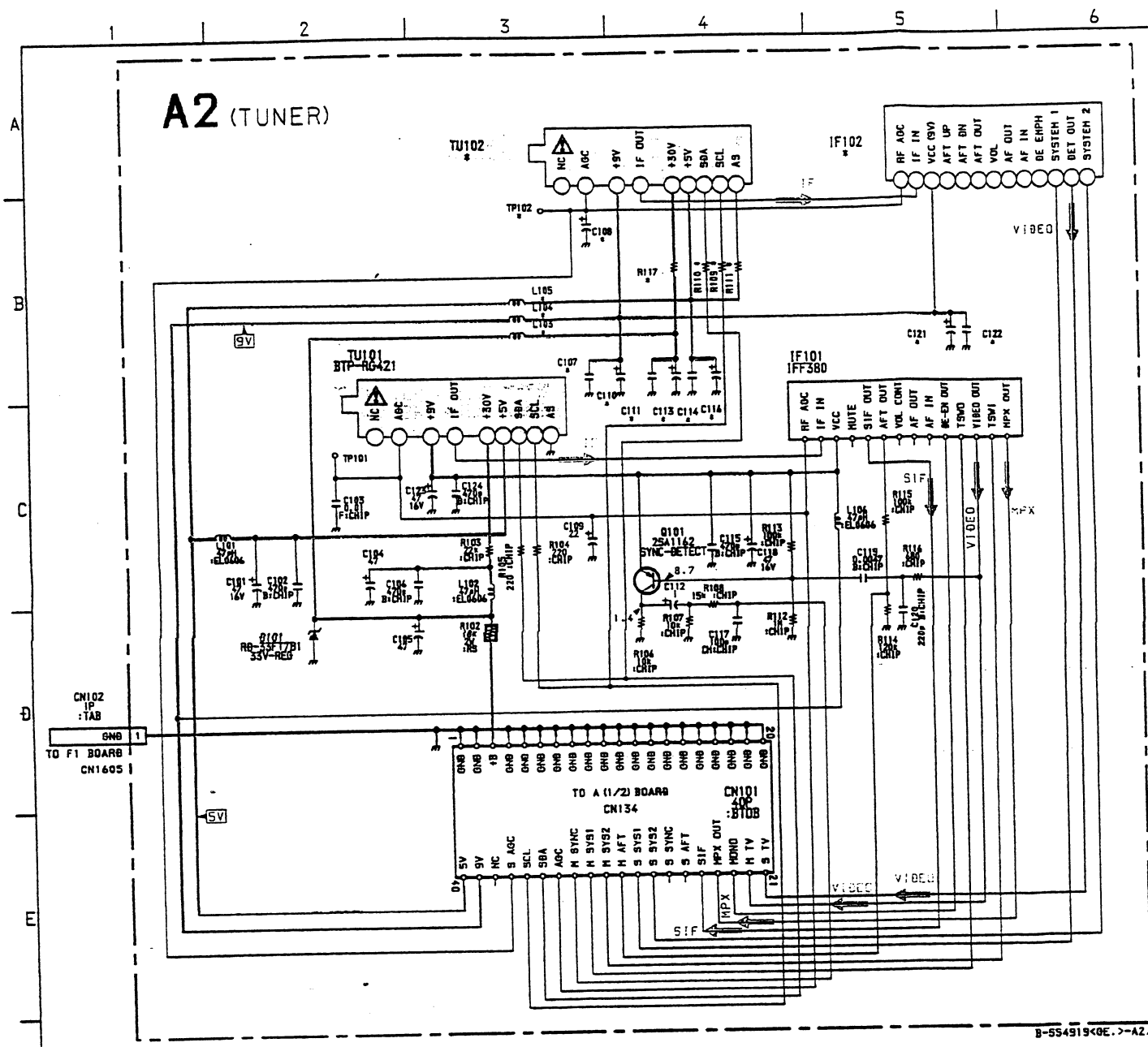
NOTE:

The circuit indicated as left contains high voltage of over 600 Vp-p. Care must be paid to prevent an electric shock in inspection or repairing.

A BOARD

IC		Q309		D303	
IC001	D-6,	Q310	D-11	D304	D-12
	D-9		Q311		D305
IC002	E-6	Q601	C-11	D306	C-11
IC003	E-7		Q602		D307
IC004		Q603	F-3	D308	E-4
IC301	A-12		Q604		D309
IC302	C-5	Q605	F-3	D310	C-10
IC303	C-11		Q606		D311
IC601	F-2,	Q607	E-1,	D601	F-2,
	F-14		E-15		F-14
IC602	F-2,	Q608	E-3,	D602	E-2
	F-14		E-13		F-14
IC650	A-1,	Q611	E-2,	D603	F-2,
	A-15		E-14		F-14
IC651	E-3,	Q612	E-14	D604	E-2
	E-13		E-13		D605
IC652	B-2,	Q651	E-3,	D606	F-14
	B-14		E-13		D607
IC1201	E-5	Q652	E-13	D608	E-1
IC1202	D-5,		B-15		D609
	D-11	Q653	B-15	D610	F-3
IC2001	C-6		A-14		F-2,
IC2002	C-7,	Q1201	E-10	D611	F-13
	C-9		E-10		F-13
IC2601	C-3,	Q1202	E-10	D612	E-13
	C-13		E-10		D613
IC2602	C-4,	Q1203	E-11	D614	E-2,
	C-12		E-11		E-14
IC2603	C-3,	Q1204	E-11	D615	E-3
	C-13		E-11		F-13
TRANSISTOR		Q1205	E-10	D651	D-13
			E-10		D652
Q101	E-9	Q1206	E-10	D654	C-2,
Q203	F-12		E-11		C-14
Q204	F-12	Q1207	E-11	D655	C-15
Q301	A-13		E-11		C-14
Q302	C-11	Q1208	E-11	D656	A-15
Q303	C-10		E-11		D-13
Q304	C-11	Q1209	E-10	D657	
Q305	A-12		F-10		
Q306	A-12	Q1210	C-9		
Q307	E-4				
Q308	E-4	DIODE			
		D009	E-9		
			E-9		
		D010	E-7		
			E-9		
		D011	F-12		
			F-4		
		D012	F-12		
			F-12		
		D201	F-12		
			F-12		
		D202	F-12		
			F-12		
		D203	F-12		
			F-12		
		D204	F-12		
			F-12		
		D301	C-12		
			D-10		
		D302			

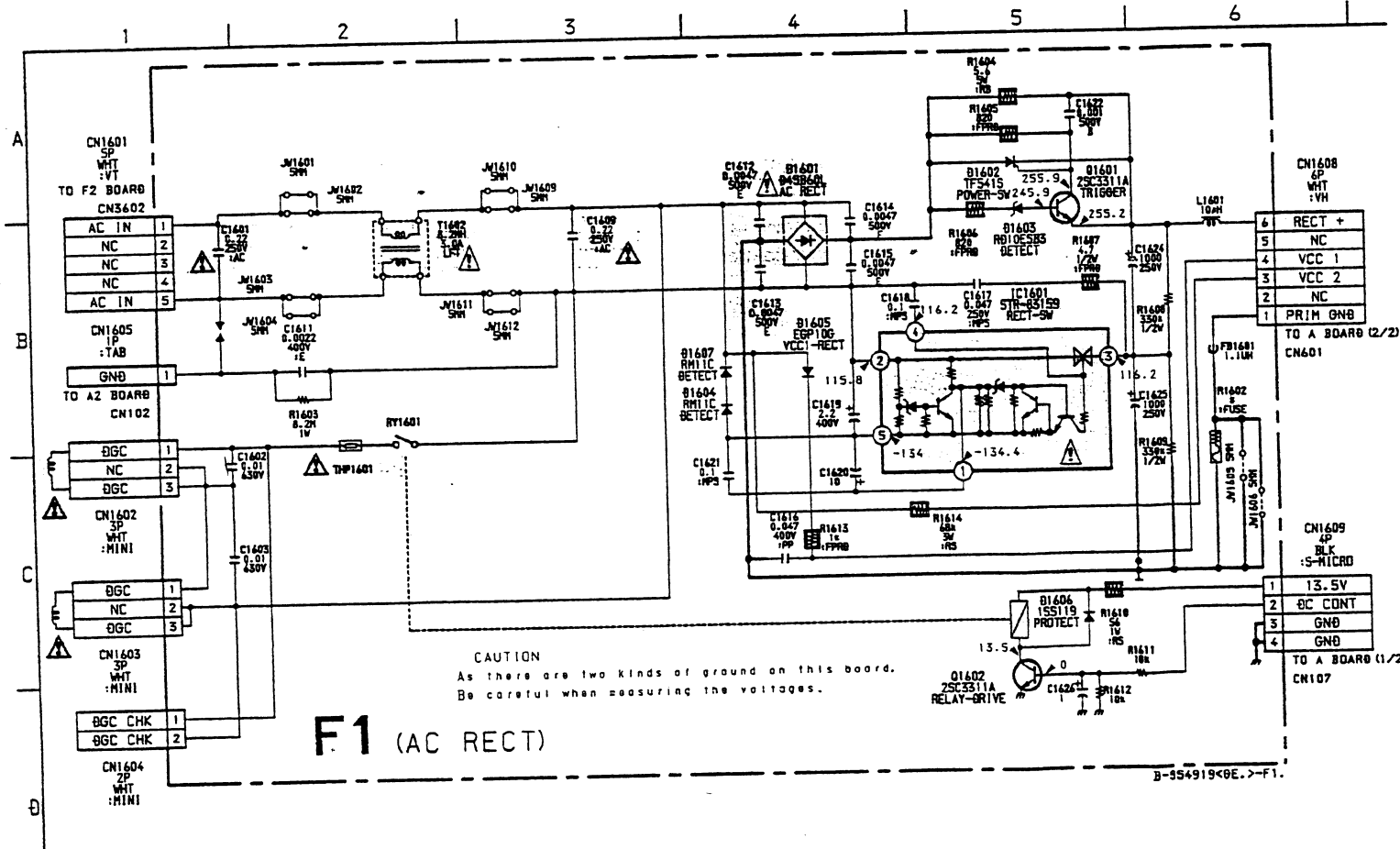




A2 BOARD * MARK

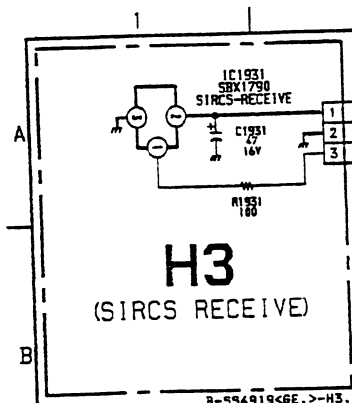
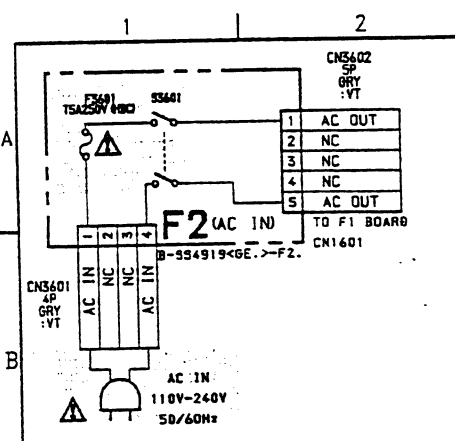
Ref. No.	Location	28 INCH	32 INCH
C107	B-3	-	470p
C108	B-3	-	22
C110	B-4	-	47 16V
C111	B-4	-	470p
C113	B-4	-	47
C114	B-4	-	470p
C116	B-4	-	47 16V
C121	B-5	-	47 16V
C122	B-5	-	470p
IF102	A-5	-	IFD380A
L103	B-3	-	47 μH
L104	B-3	-	47 μH
L105	B-3	-	47 μH
R109	B-4	-	220
R110	B-4	-	220
R111	B-4	-	10k
R117	B-4	-	22k
TP102	B-3	-	○
TU102	A-3	-	BTP-RG421

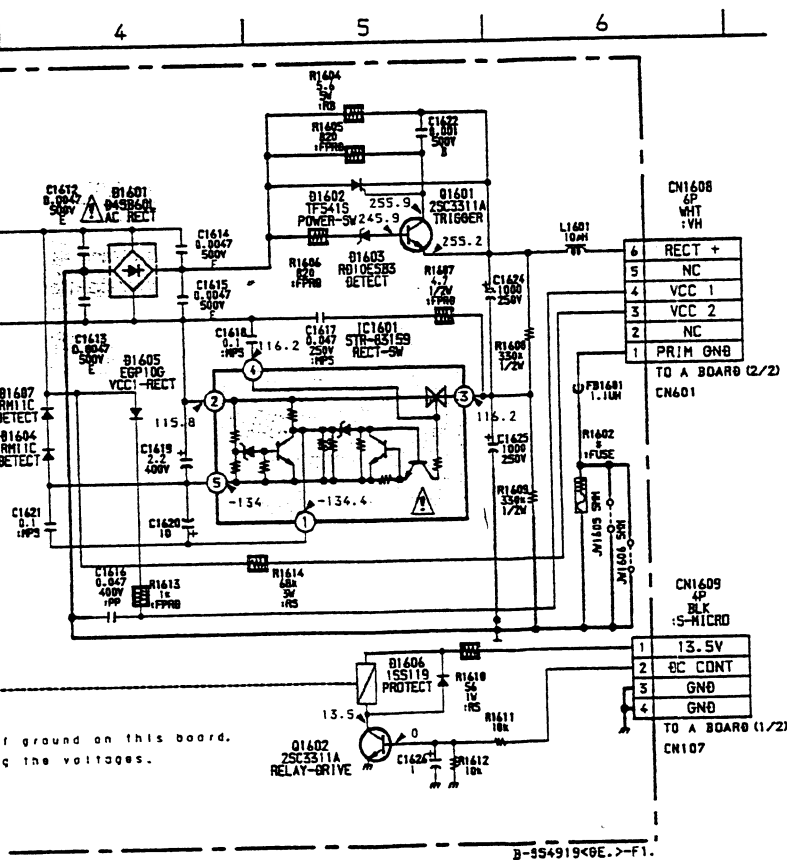
○: TO BE MOUNT
-: NOT MOUNT



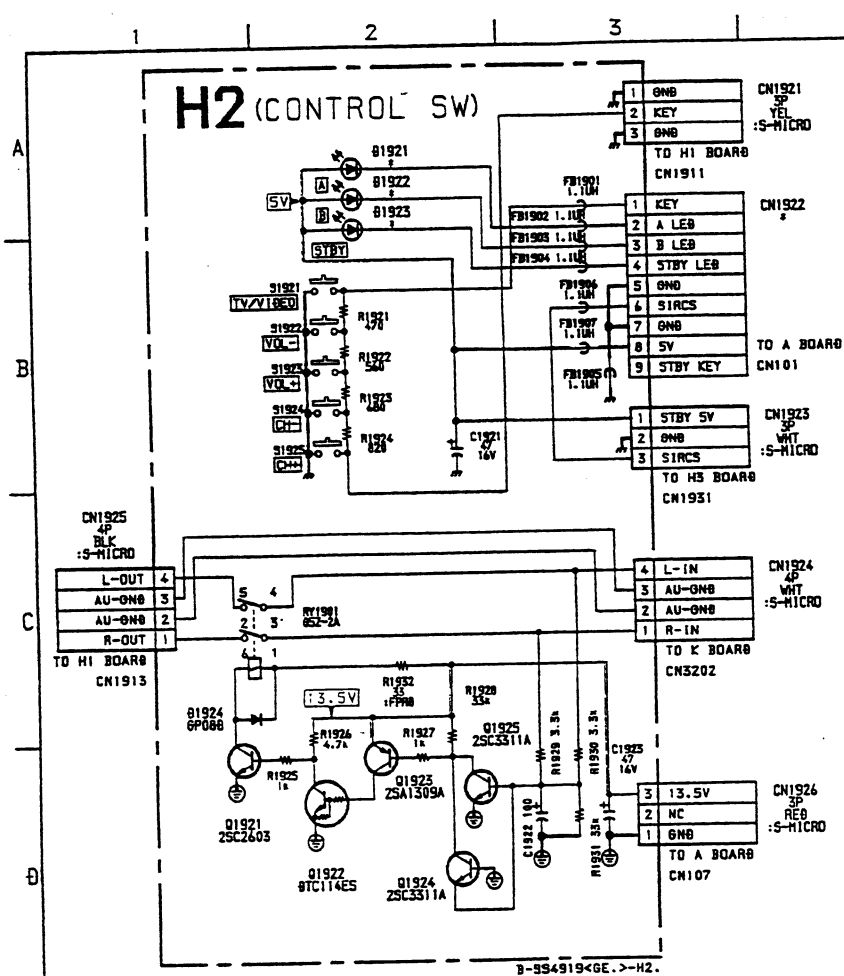
H2 BOARD * MARK

Ref. No.	Location	28 INCH
CN1922	B-4	9P WHT
D1921	A-2	SLR-54VC12
D1922	A-2	SLR-54VC12
D1923	A-2	SLR-54VC12





Ref. No.	Location	28 INCH	32 INCH
C107	B - 3	-	470p
C108	B - 3	-	22
C110	B - 4	-	47 16V
C111	B - 4	-	470p
C113	B - 4	-	47
C114	B - 4	-	470p
C116	B - 4	-	47 16V
C121	B - 5	-	47 16V
C122	B - 5	-	470p
IF102	A - 5	-	IFD380A
L103	B - 3	-	47 uH
L104	B - 3	-	47 uH
L105	B - 3	-	47 uH
R109	B - 4	-	220
R110	B - 4	-	220
R111	B - 4	-	10k
R117	B - 4	-	22k
TP102	B - 3	-	○
TU102	A - 3	-	BTP-RG421

[illegible]

Ref. No.	Location	28 INCH	32 INCH
CN1922	B - 4	9P WHT	9P WHT-L
D1921	A - 2	SLR-54VC12	SEL1222R-C, D
D1922	A - 2	SLR-54VC12	SEL1222R-C, D
D1923	A - 2	SLR-54VC12	SEL1222R-C, D

1

2

A

B

IC1931
56K1790
SIRCS RECEIVE

1 5V 5V

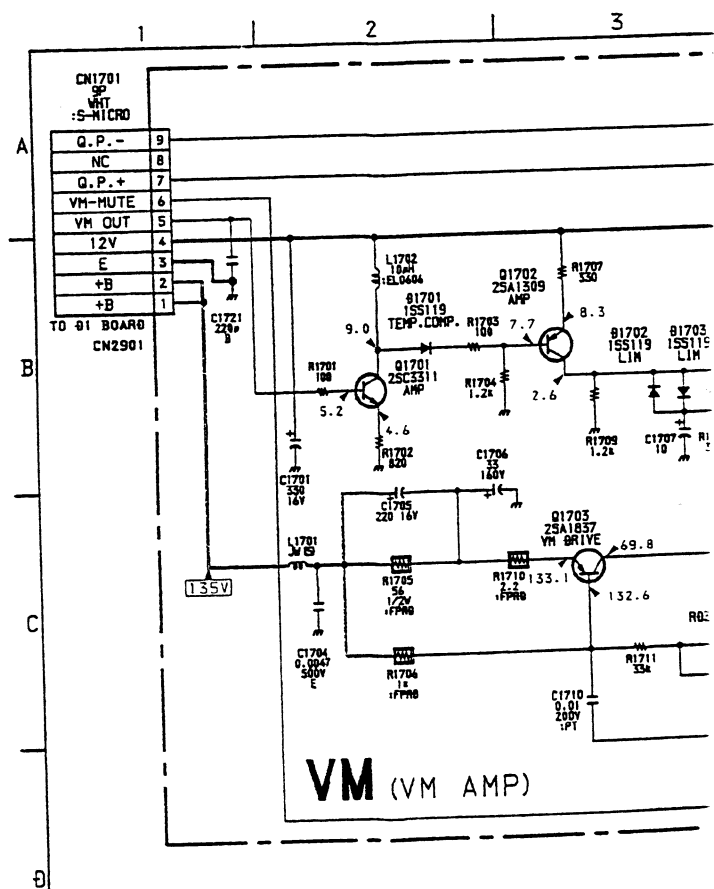
2 GND

3 SIRCS

CH1931
3P
WHT
TO H2 BOARD
CN1923

H3
(SIRCS RECEIVE)

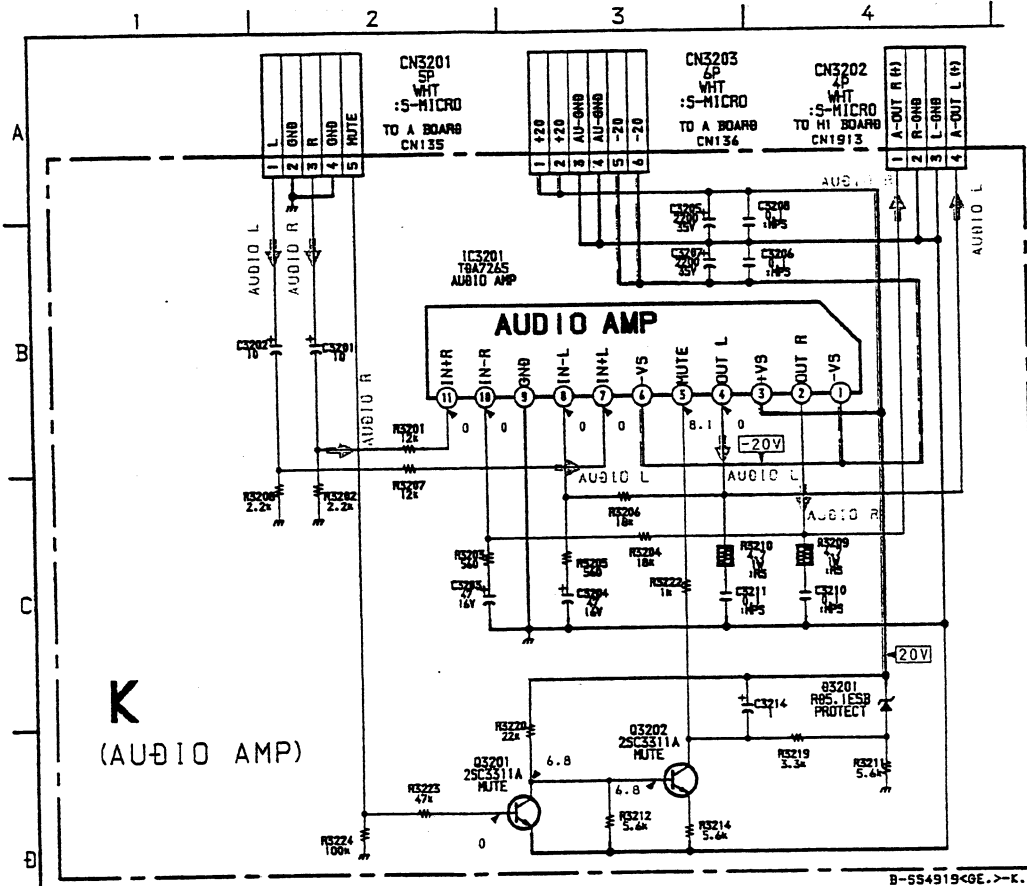
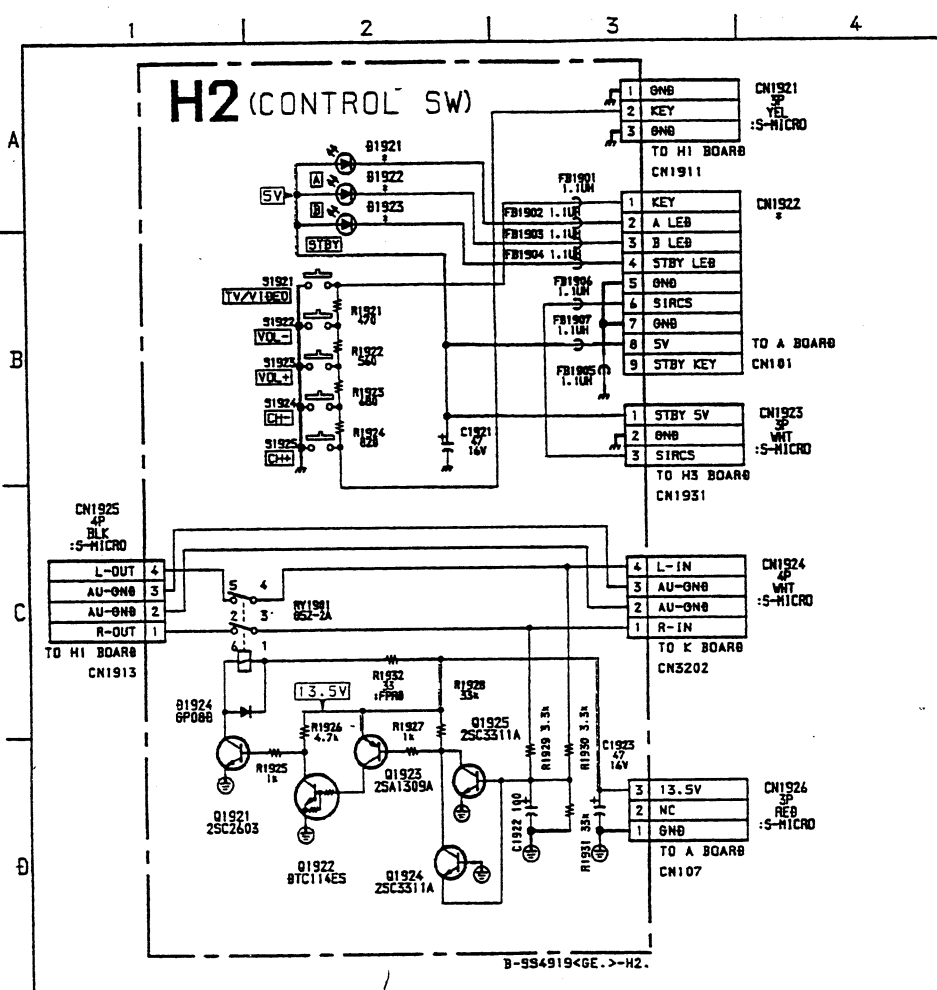
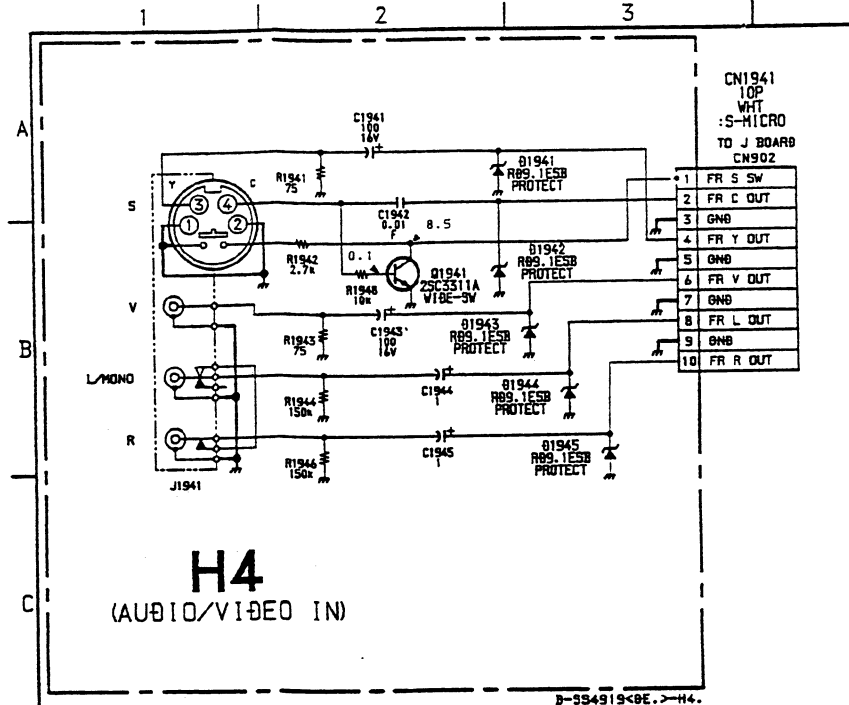
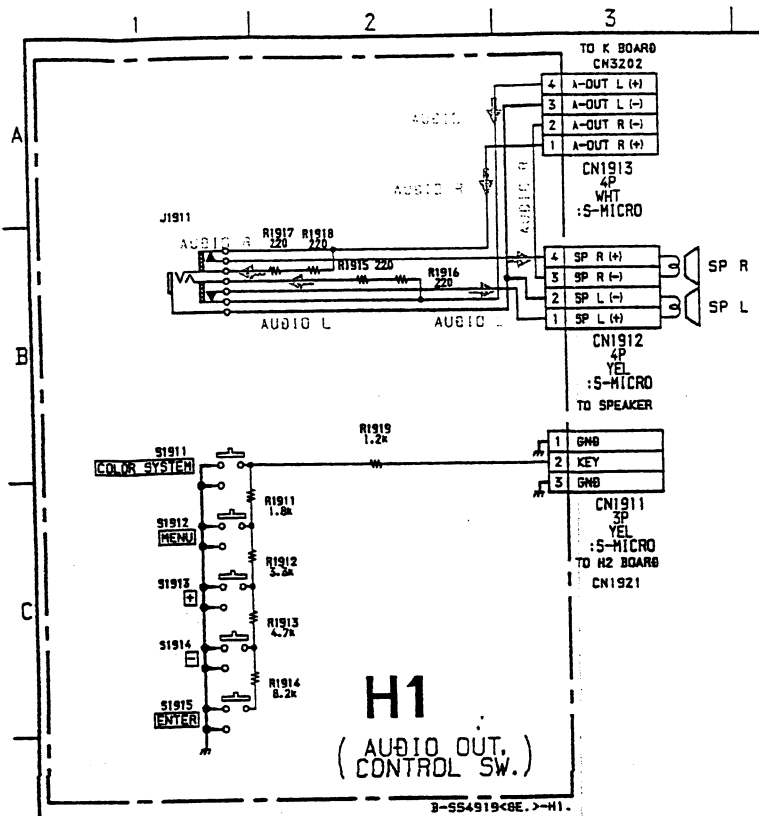
R-594919<6E.>-H3.



* MARK

on	28 INCH	32 INCH
-	-	470p
-	-	22
-	-	47 16V
-	-	470p
-	-	47
-	-	470p
-	-	47 16V
-	-	470p
-	-	IFD380A
-	-	47 uH
-	-	47 uH
-	-	47 uH
-	-	220
-	-	220
-	-	10k
-	-	22k
-	-	O
-	-	BTP-RG421

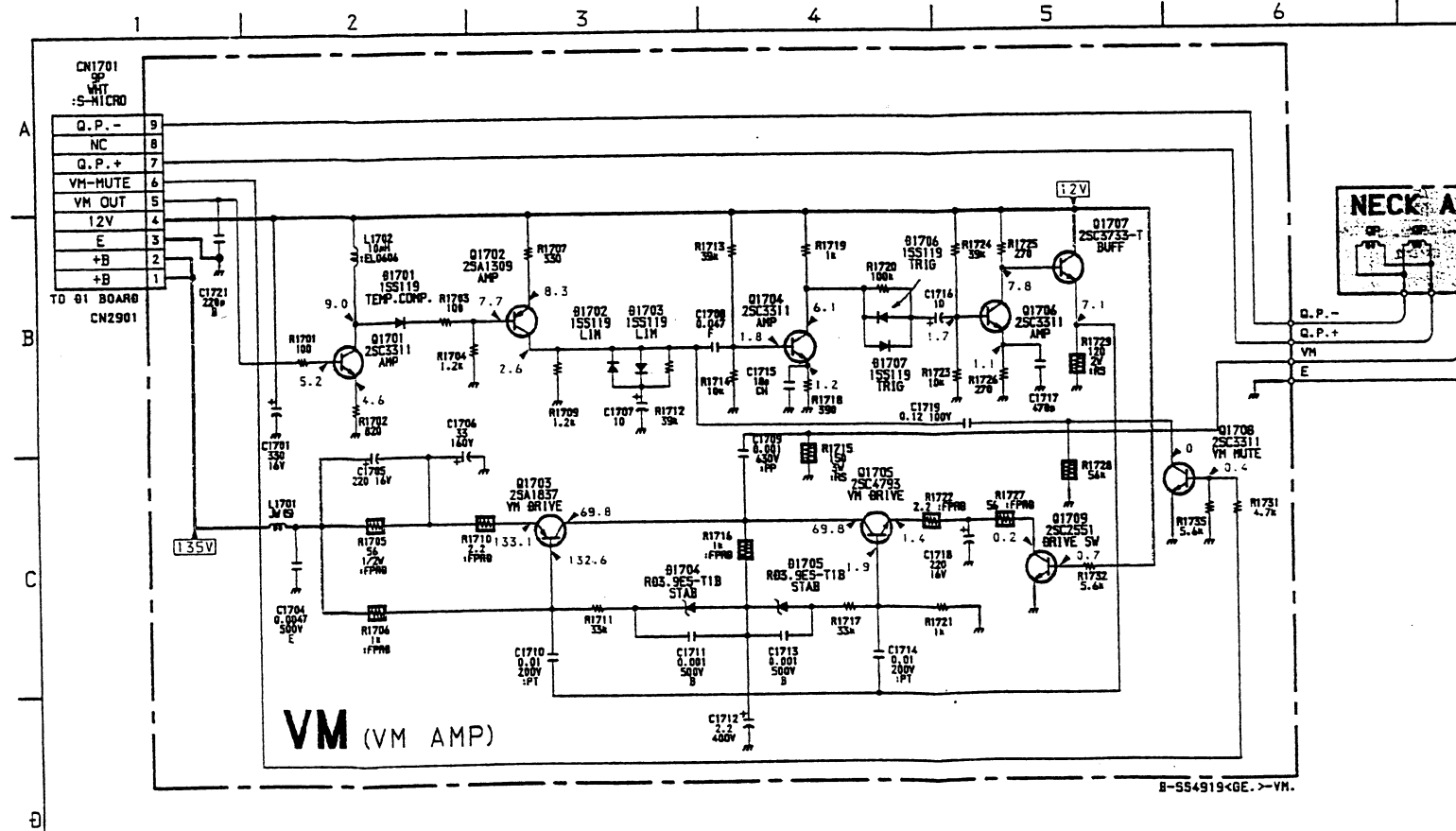
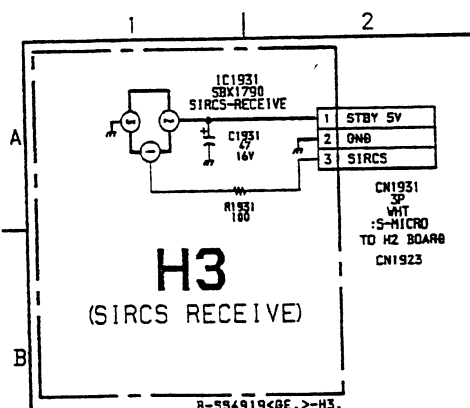
○: TO BE MOUNT
-: NOT MOUNT



H2 BOARD * MARK

Ref. No.	Location	28 INCH	32 INCH
CN1922	B - 4	9P WHT	9P WHT-L
D1921	A - 2	SLR-54VC12	SEL1222R-C, D
D1922	A - 2	SLR-54VC12	SEL1222R-C, D
D1923	A - 2	SLR-54VC12	SEL1222R-C, D

○: TO BE MOUNT
-: NOT MOUNT



2

[CONTROL SW]

H3

[SIRCS RECEIVE]

H4

[AUDIO/VIDEO IN]

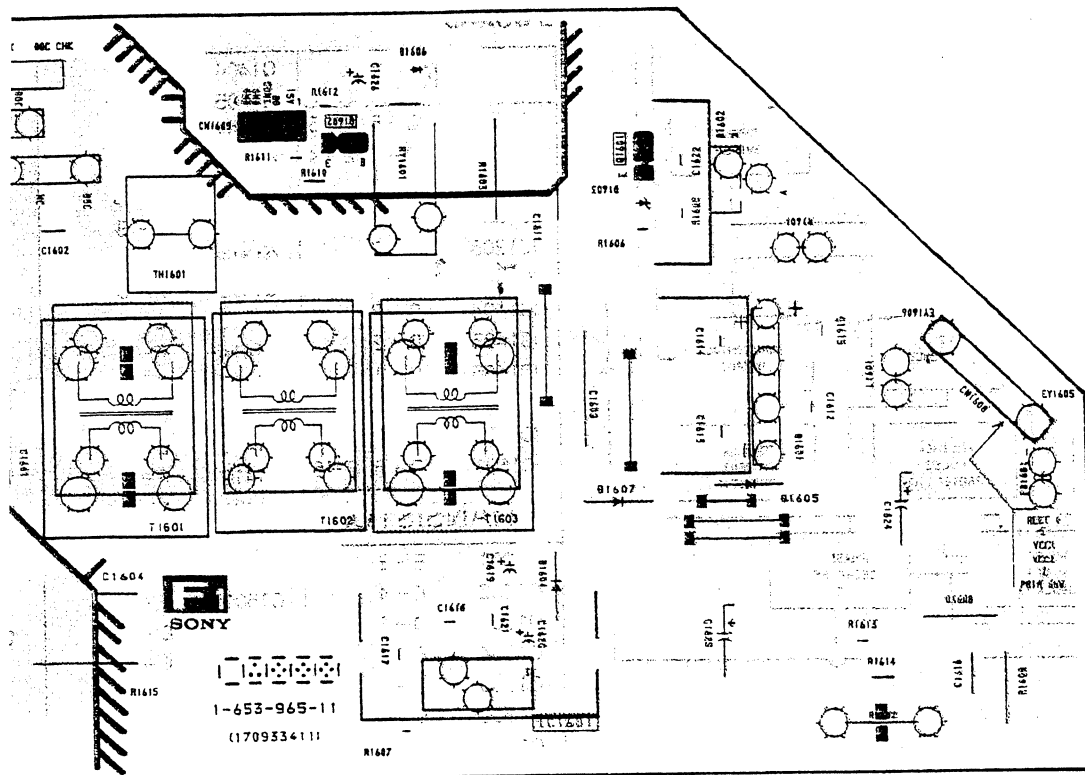
K

[AUDIO AMP]

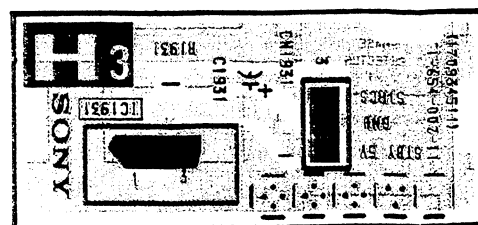
VN

[VM AMP]

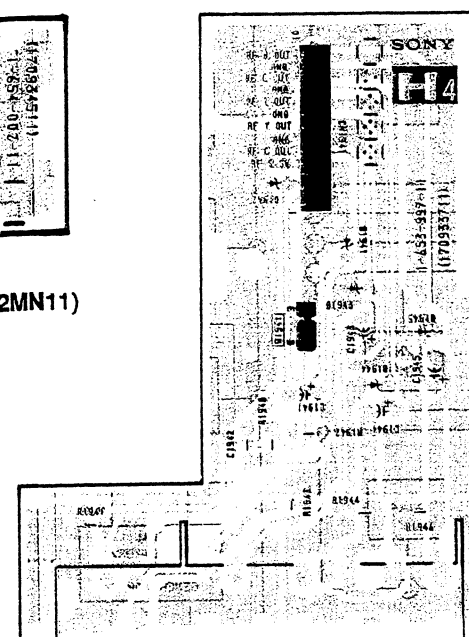
) —



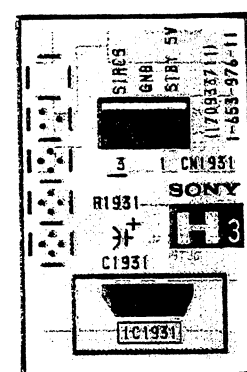
- H3 BOARD - (KV-W28MH11 / W28MN11)



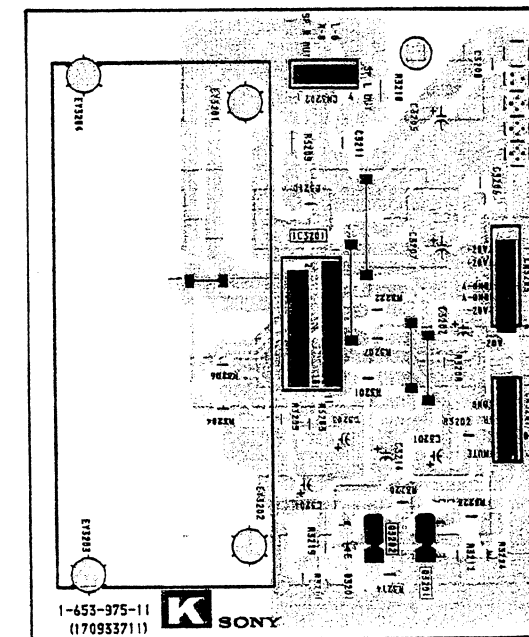
- H4 BOARD -



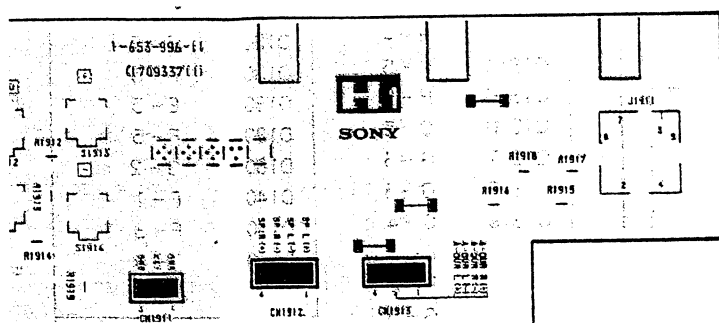
- H3 BOARD - (KV-W32MH11 / W32MN11)



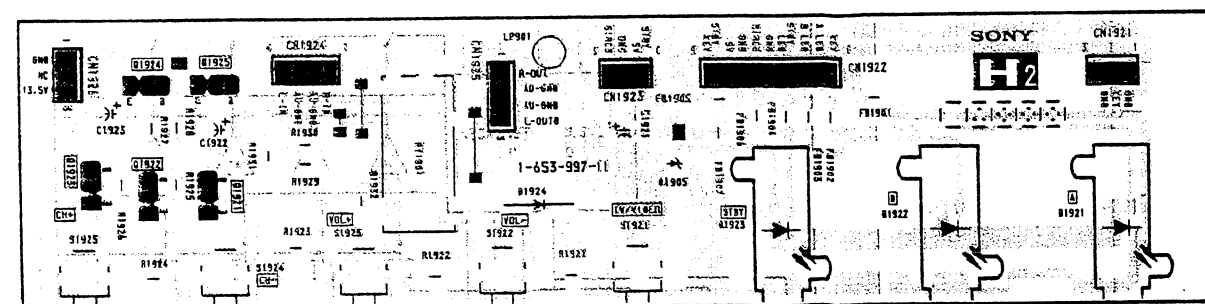
- K BOARD -



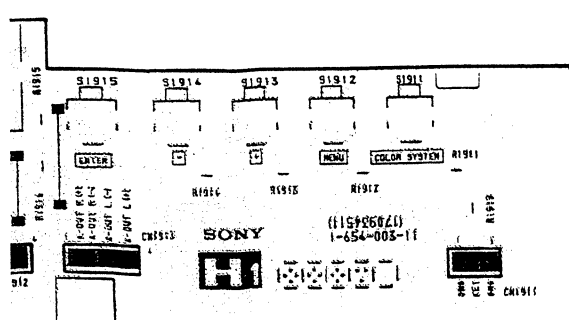
ID - (KV-W28MH11 / W28MN11)



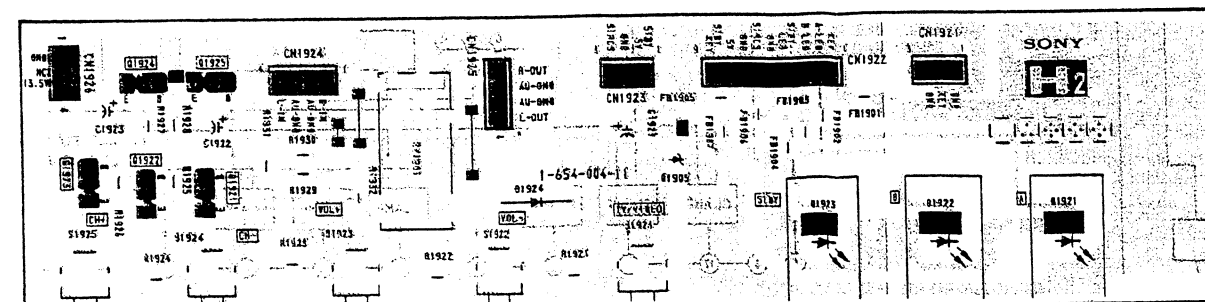
- H2 BOARD - (KV-W28MH11 / W28MN11)



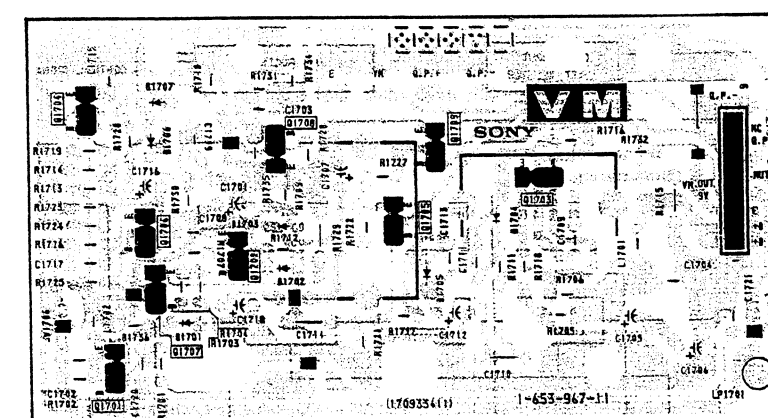
RD - (KV-W32MH11 / W32MN11)



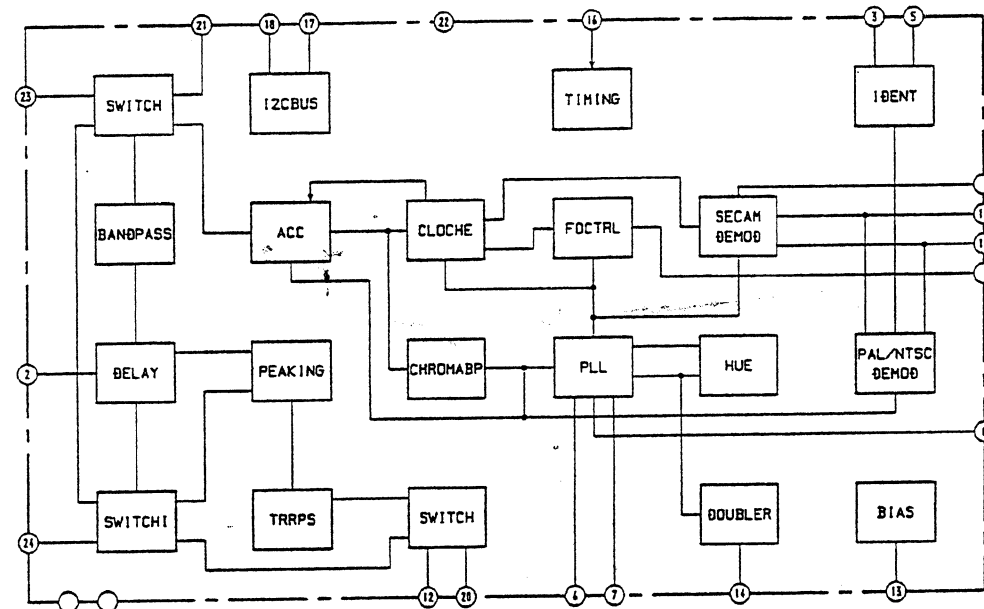
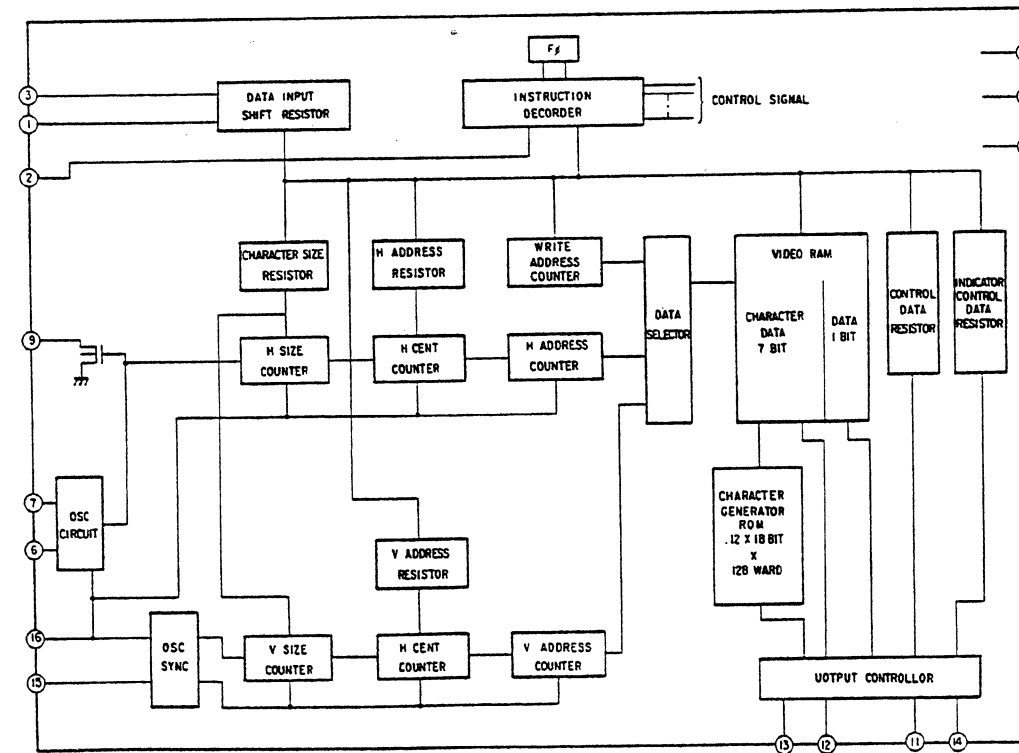
- H2 BOARD - (KV-W32MH11 / W32MN11)



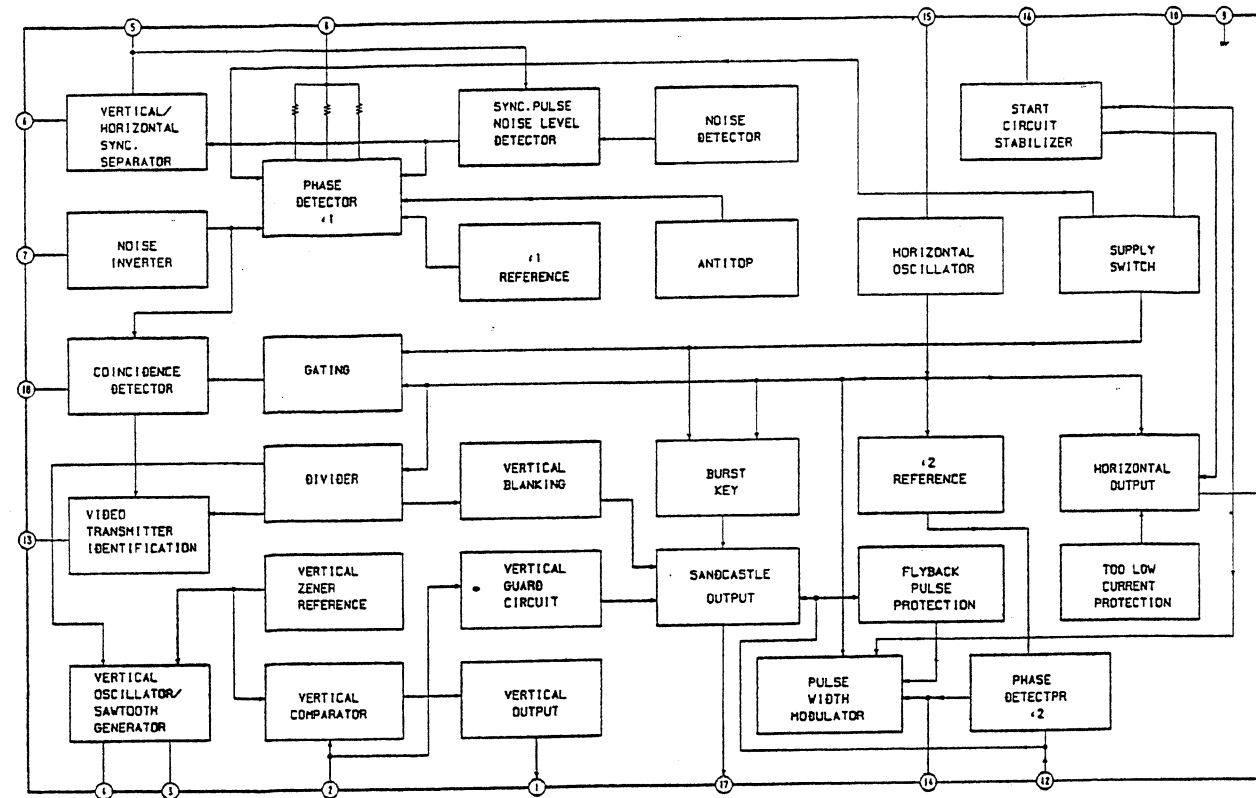
- VM BOARD -



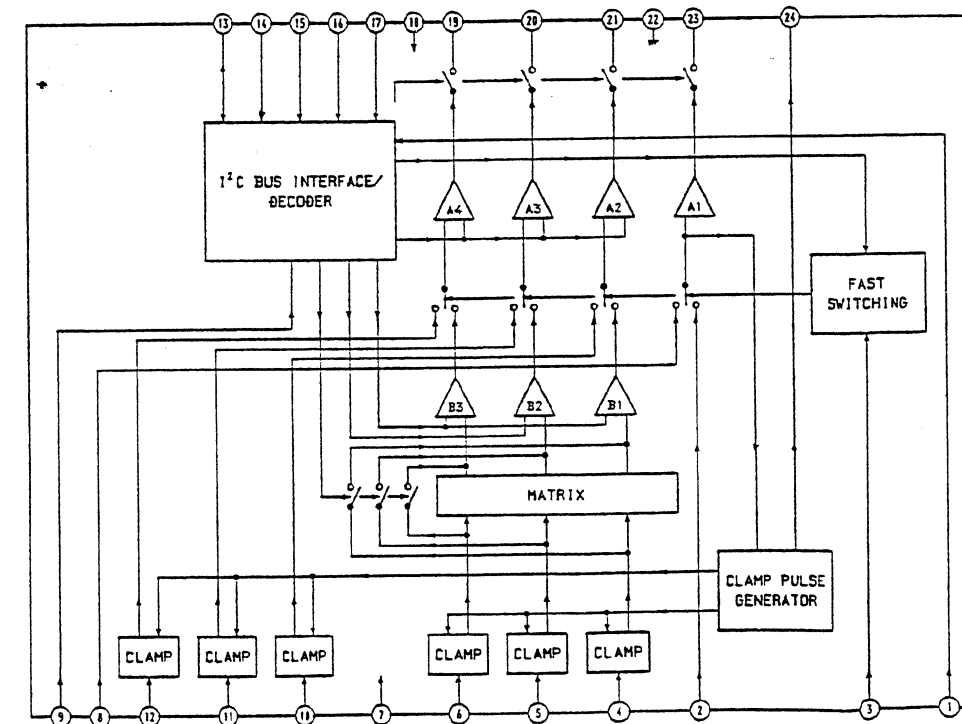
B BOARD IC1302 TDA9145/N2B

B BOARD IC1305 μ PD6456

B BOARD IC1501 TDA2579B

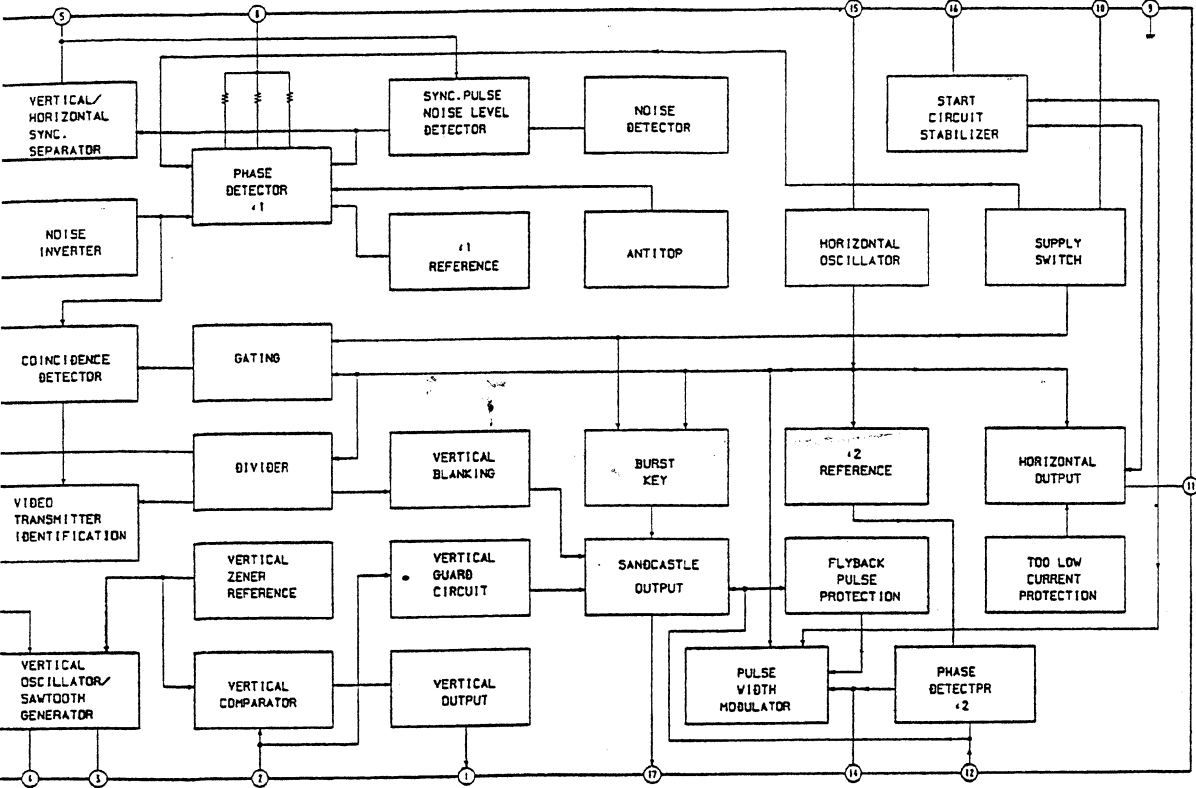


B BOARD IC1401 TDA8443B

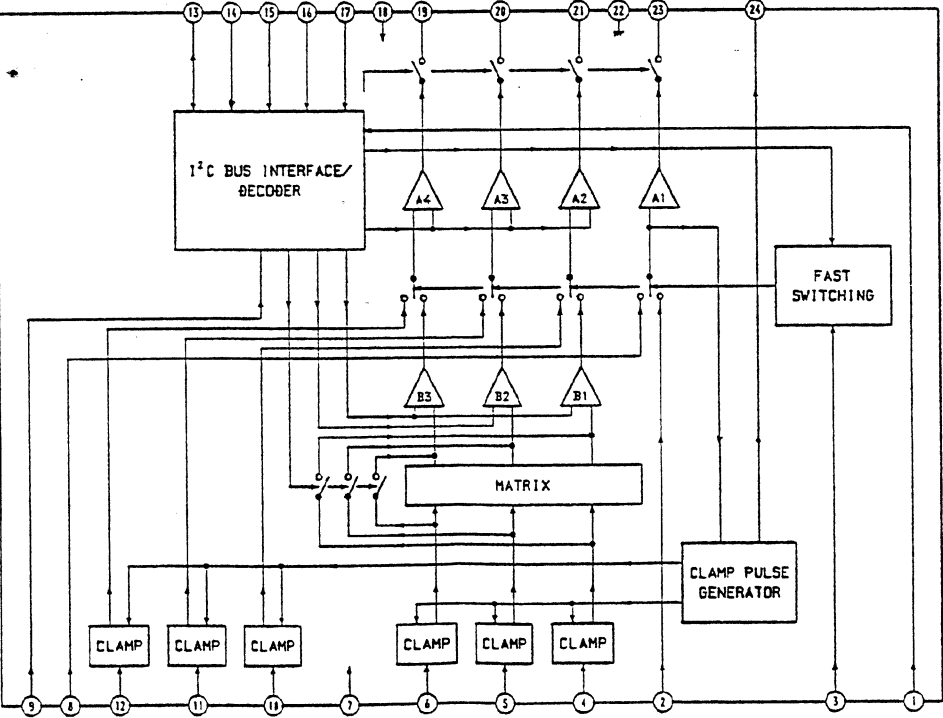


B BOARD

IC		Q1404	G-3
IC1301	C-5, F-5	Q1405	F-3
IC1302	D-4, E-4	Q1407	E-3
IC1303	B-4	Q1408	D-3
IC1304	B-5	Q1409	D-3
IC1305	B-2	Q1410	F-3
IC1401	B-3, G-3	Q1411	G-2
IC1404	D-2	Q1412	F-3
IC1405	D-2	Q1413	G-2
IC1406	D-1	Q1414	F-1
IC1407	B-2, G-2	Q1415	C-1
IC1408	B-1, G-1	Q1416	C-1
IC1501	D-6, E-6	Q1417	E-1
TRANSISTOR		Q1418	F-1
		Q1421	F-3
		Q1422	C-2
		Q1423	C-1
Q1301	E-3	Q1501	F-6
Q1302	E-4	Q1502	C-5
Q1303	D-3	Q1505	E-6
Q1304	E-3	Q1506	E-6
Q1305	C-4	Q1507	F-5
Q1306	D-5	Q1508	E-6
Q1307	F-5	DIODE	
Q1308	C-5		
Q1309	G-6		
Q1310	G-5		
Q1311	G-5	D1301	B-4
Q1312	H-4	D1302	E-4
Q1314	H-5	D1303	E-5
Q1315	H-5	D1304	F-5
Q1316	G-5	D1305	E-5
Q1317	G-6	D1307	F-5
Q1318	G-5	D1309	G-2
Q1319	C-4	D1401	F-1
Q1320	E-4	D1402	F-3
Q1323	F-2	D1501	F-4
Q1324	G-5	D1502	F-4
Q1325	G-5	VARIABLE RESISTOR	
Q1401	F-3		
Q1402	C-3		
Q1403	G-3		
		RV1501	D-5

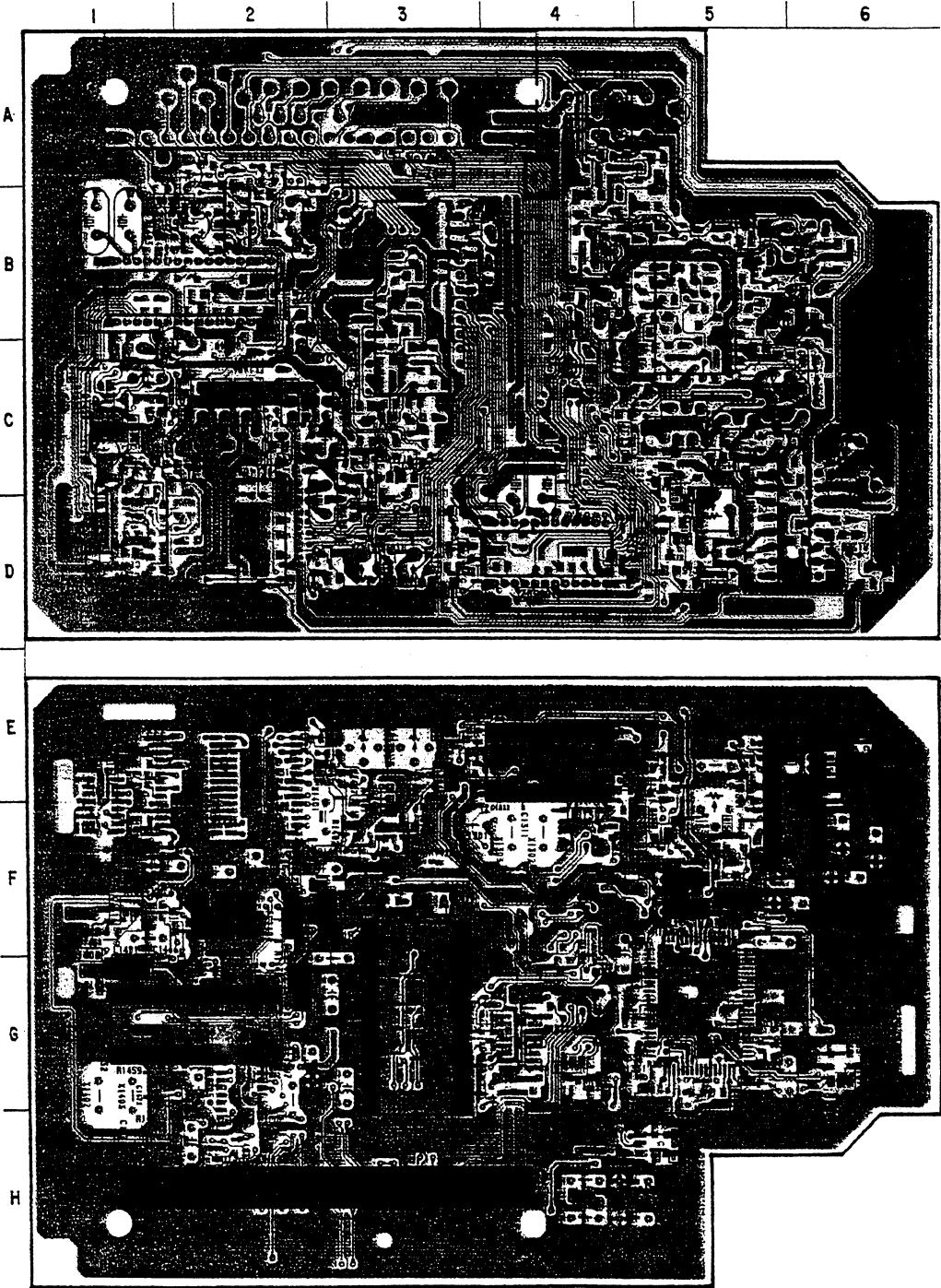


B BOARD IC1401 TDA8443B

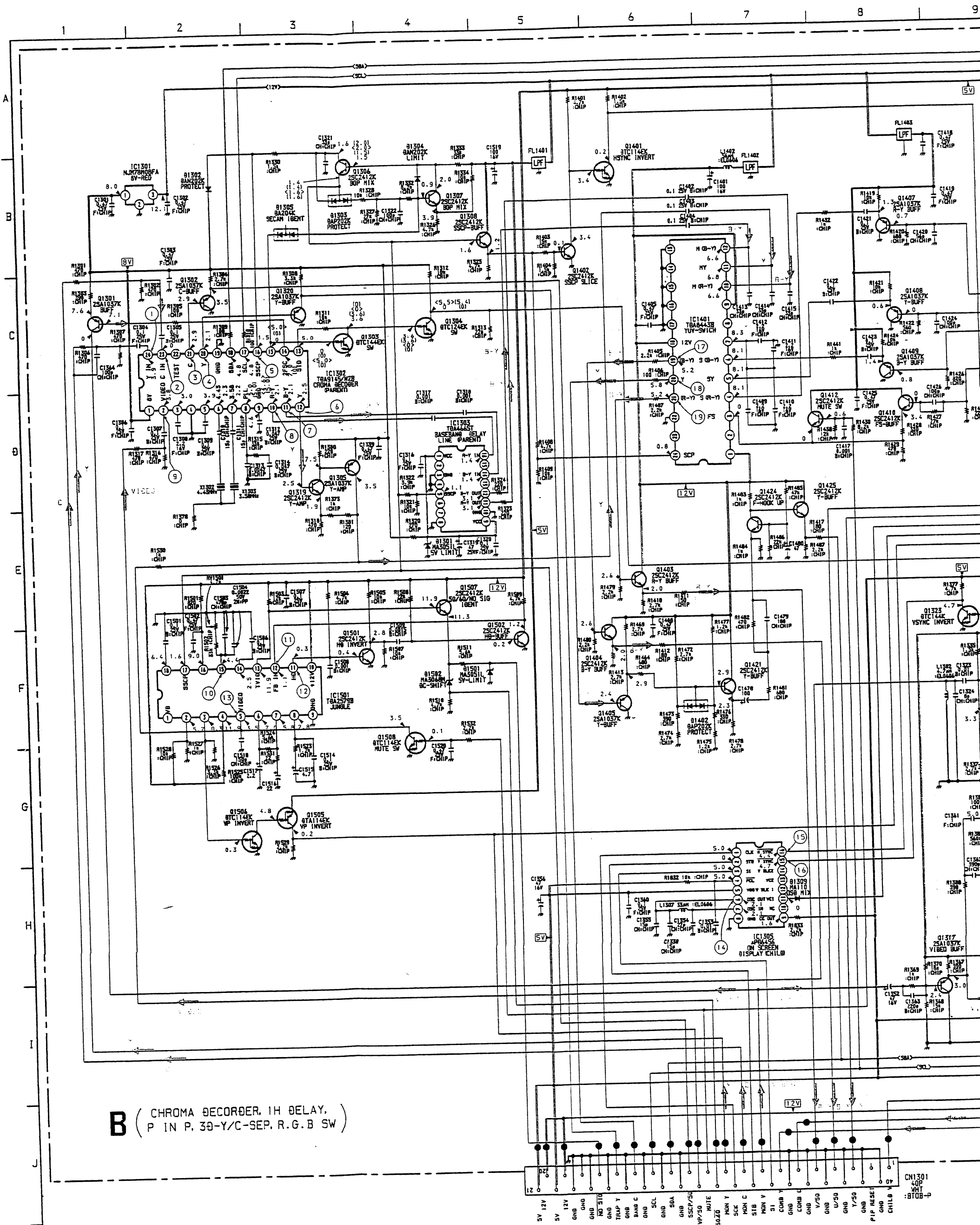


B CHROMA DECODER,
1H DELAY, P IN P,
3D-Y/C-SEP, R. G. B SW

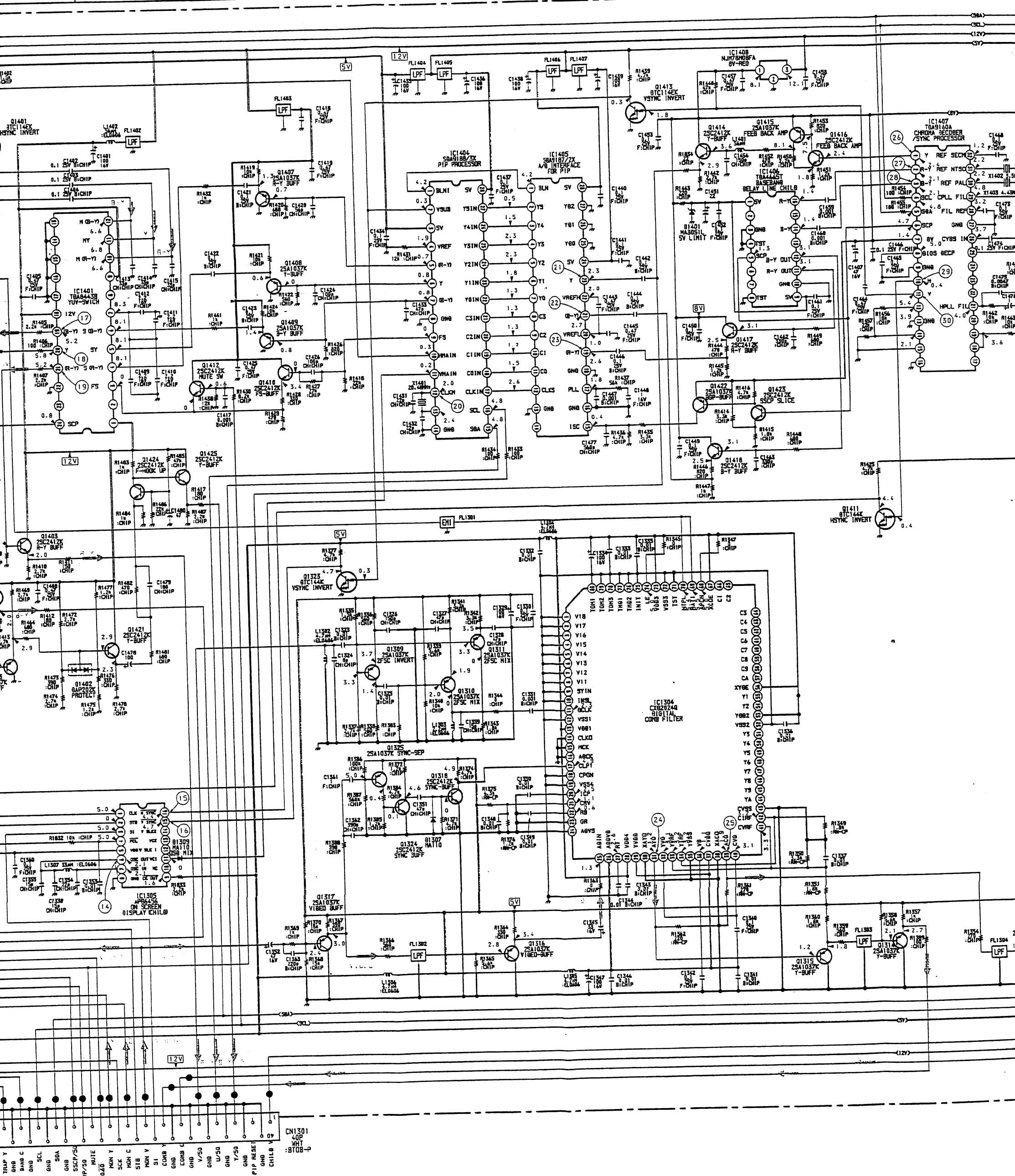
— B BOARD —

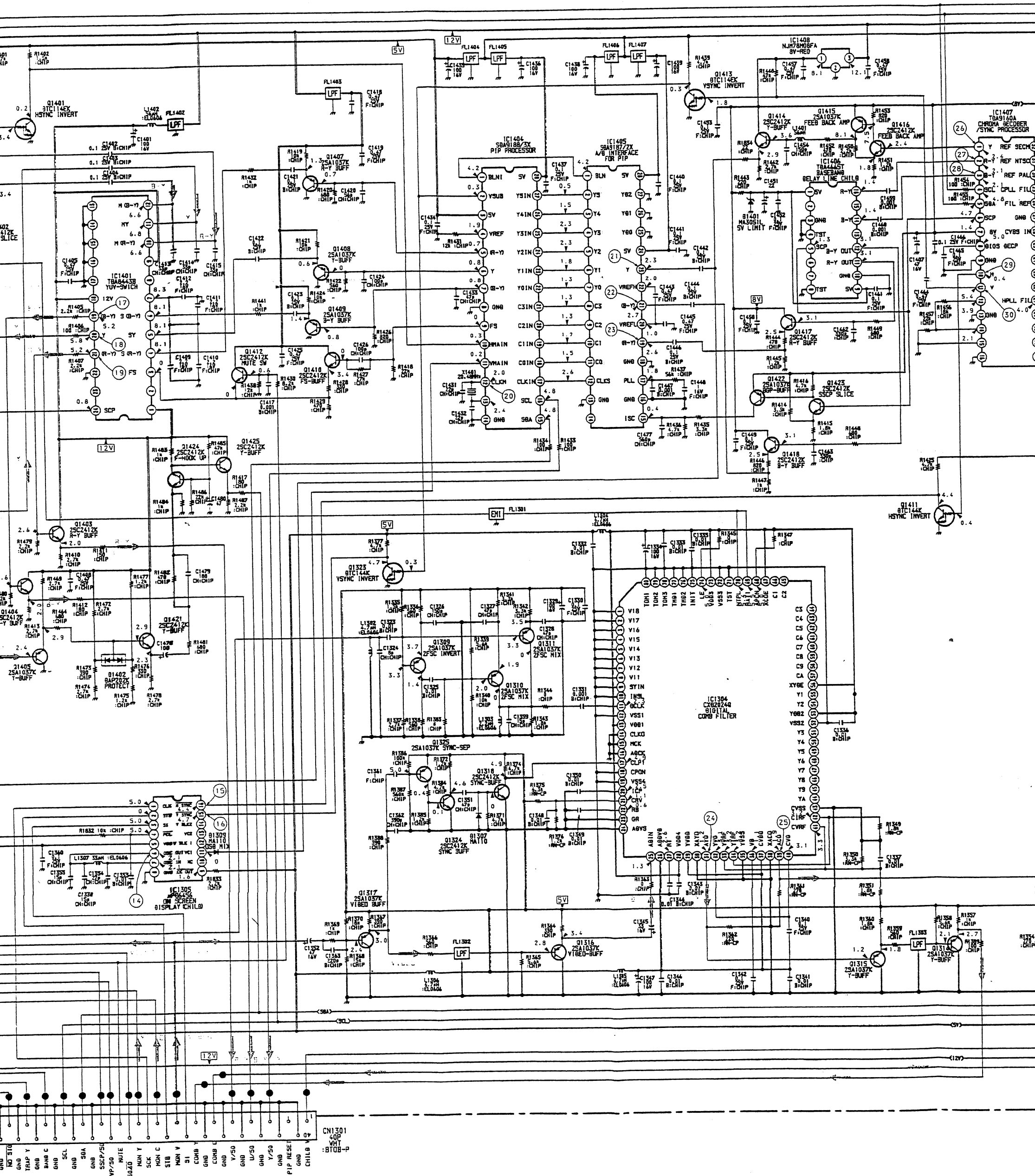


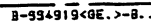
Note :
• : Pattern from the side which enables seeing.
• : Pattern of the rear side.



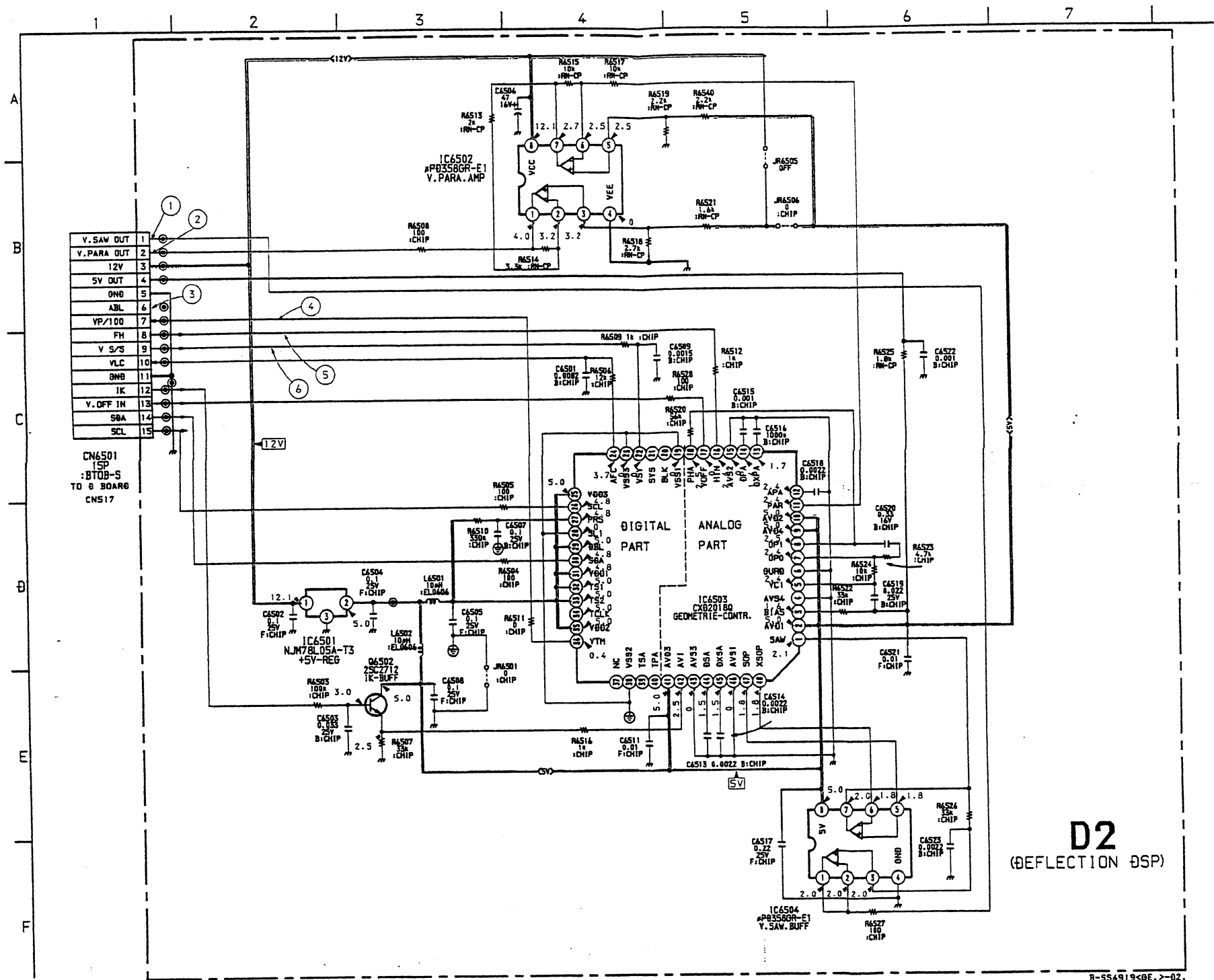
B (CHROMA DECODER, LH DELAY, P IN P, 30-Y/C-SEP, R.G.B SW)



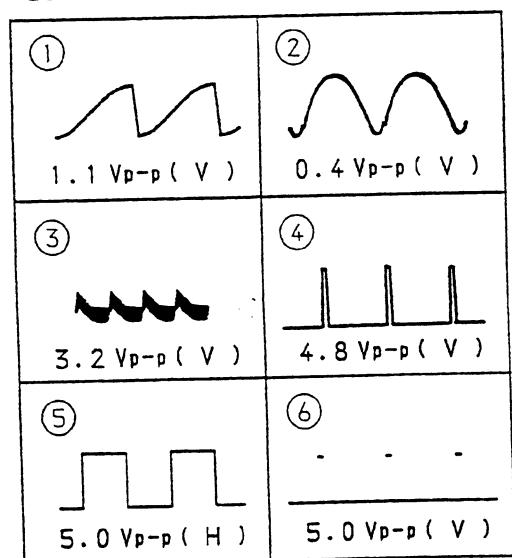




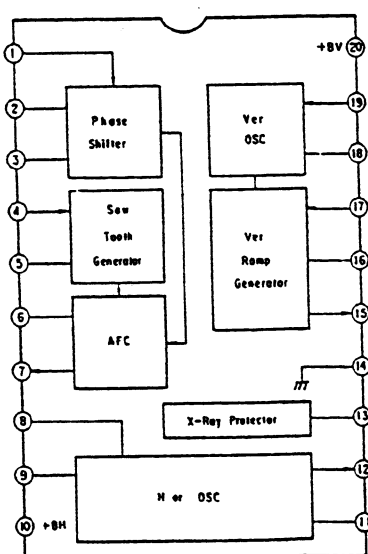
① 0.95 V _{p-p} (H)	② 0.6 V _{p-p} (H)	③ PAL 1.4 V _{p-p}
③ 0.9 V _{p-p} (H)	③ NTSC 3.58 NTSC 4.43 2.0 V _{p-p} (H) 1.4 V _{p-p} (H)	④ 1.8 V _{p-p} (H)
⑤ 9.0 V _{p-p} (H)	⑥ 0.5 V _{p-p} (H)	⑦ PAL 0.8 V _{p-p} SECAM 1.2 V _{p-p}
⑦ NTSC 3.58 NTSC 4.43 0.7 V _{p-p} (H)	⑧ PAL 0.7 V _{p-p} (H) SECAM 1.2 V _{p-p} (H)	⑧ NTSC 3.58 NTSC 4.43 0.6 V _{p-p}
⑨ PAL 0.9 V _{p-p} (H)	⑨ SECAM 1.0 V _{p-p} (H)	⑨ NTSC 3.58 NTSC 4.43 1.0 V _{p-p} 1.2 V _{p-p}
⑩ 3.2 V _{p-p} (H)	⑪ 6.0 V _{p-p} (H)	⑫ 0.8 V _{p-p}
⑬ 1.3 V _{p-p} (H)	⑭ 4.0 V _{p-p} (6.25MHz)	⑮ 3.2 V _{p-p}
⑯ 3.2 V _{p-p} (H)	⑰ 3.0 V _{p-p} (H)	⑱ 2.6 V _{p-p}
⑲ 2.7 V _{p-p} (H)	⑳ 5.0 V _{p-p} (20.48MHz)	㉑ 1.0 V _{p-p}
㉒ 0.9 V _{p-p} (H)	㉓ 0.9 V _{p-p} (H)	㉔ 2.3 V _{p-p}
㉕ 1.4 V _{p-p} (H)	㉖ 0.5 V _{p-p} (H)	㉗ 0.7 V _{p-p}
㉘ 0.9 V _{p-p} (H)	㉙ 3.2 V _{p-p} (H)	㉚ 5.5 V _{p-p}



D2 BOARD WAVEFORMS



D BOARD IC502 LA7856A

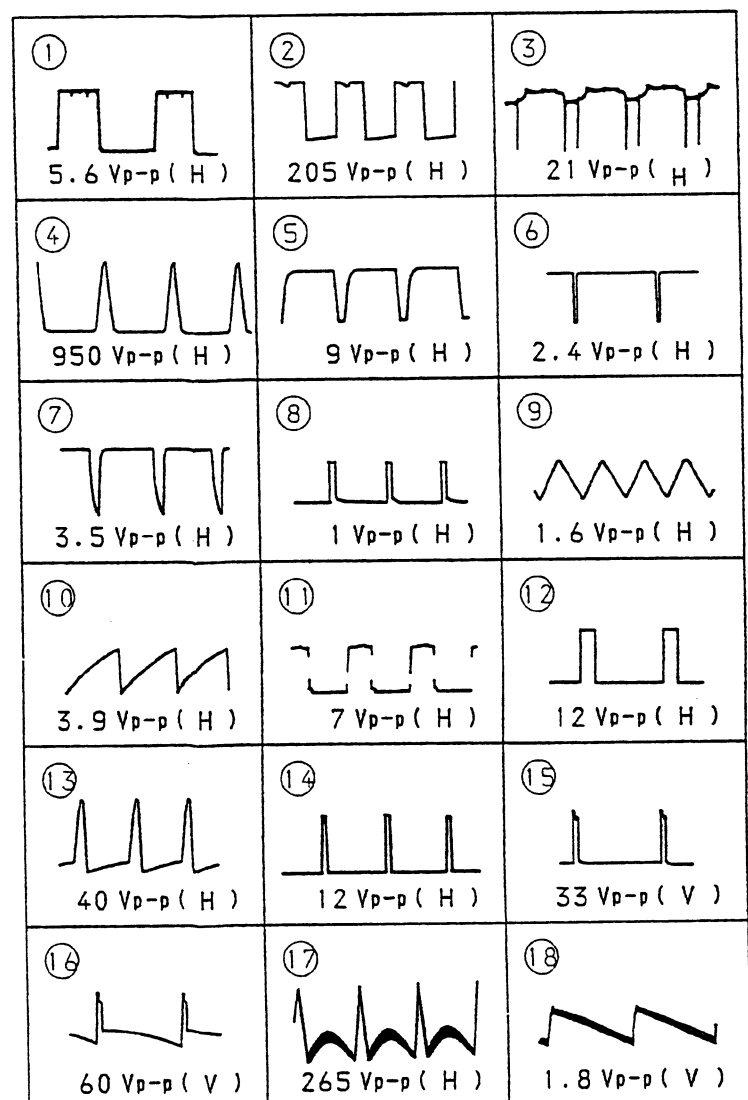


D BOARD * MARK

Ref. No.	Location	28 INCH	32 INCH
C3553	H - 10	0.0027 630V	0.0033 630V
R503	F - 9	CONDUCTOR	0
R504	F - 10	1M	470k
R538	F - 9	470k	330k
R2525	H - 1	CONDUCTOR	0
T504	B - 10	PMT	-

○: TO BE MOUNT
-: NOT MOUNT

D BOARD WAVEFORMS

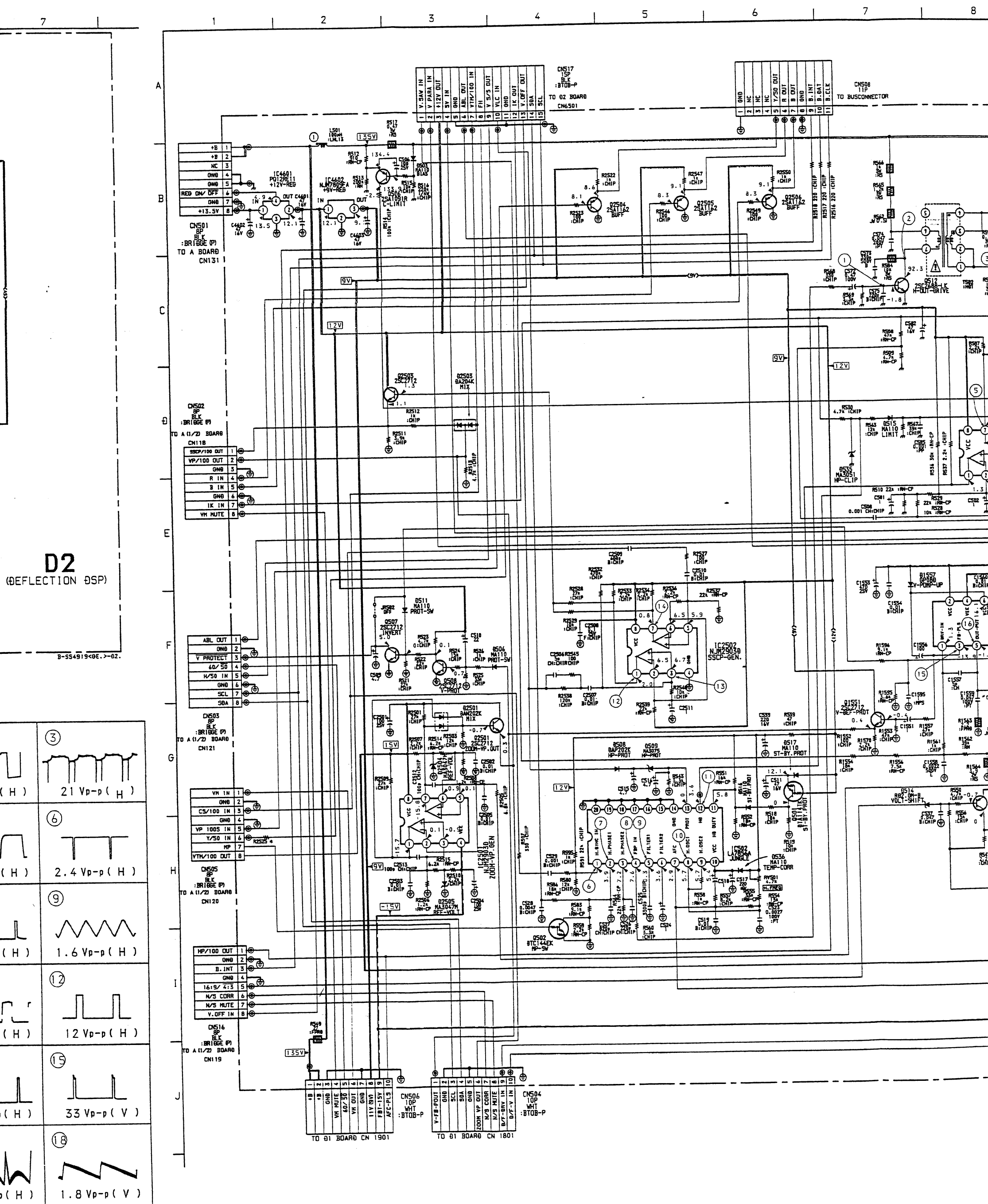


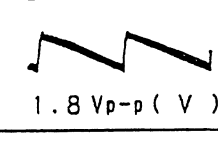
Schematic diagram

← B board

Schematic diagrams

D2 D boards →

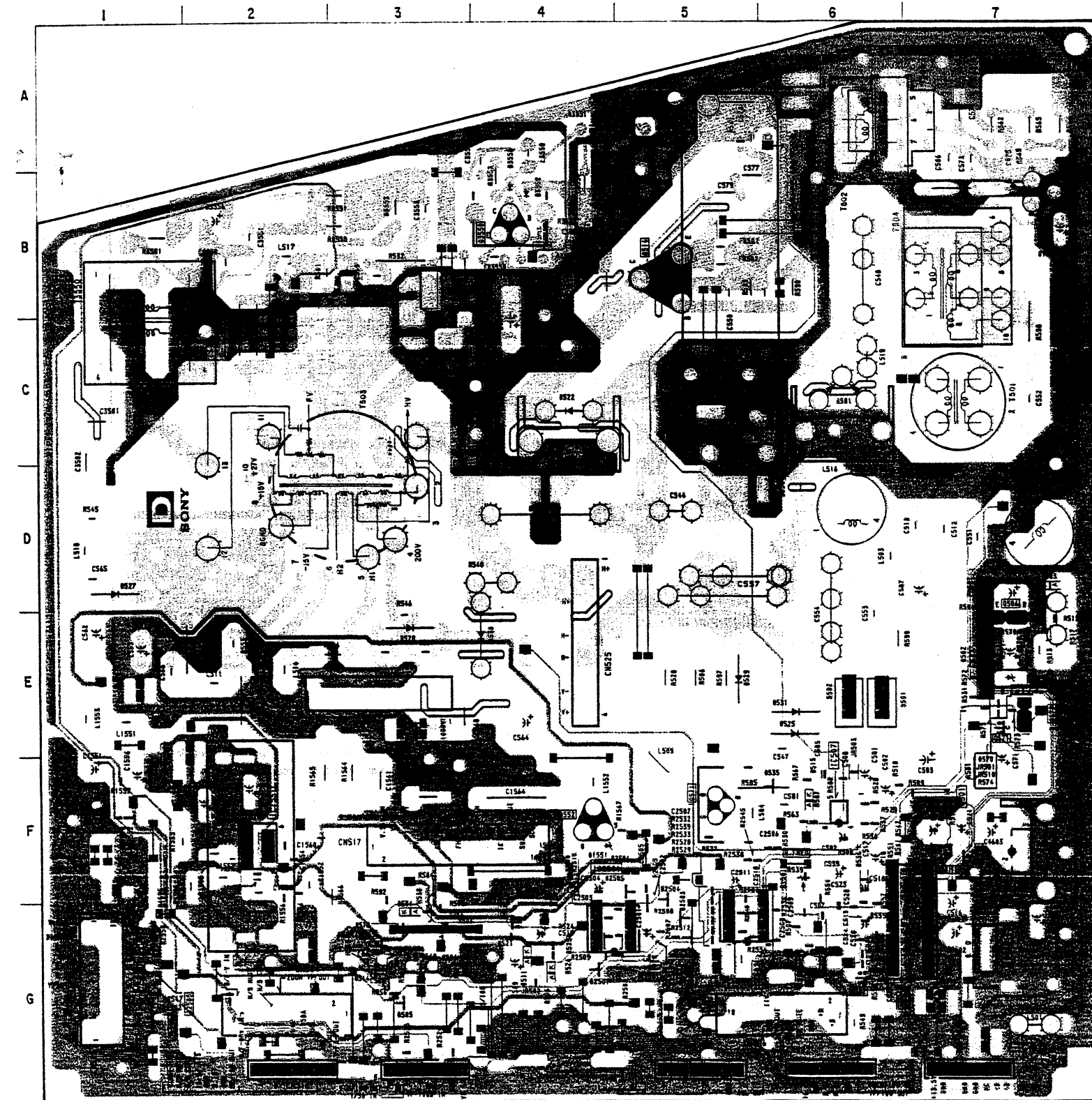




D H/V DEFLECTION,
H/V OUT, PINCUSHION,
H/V PROTECT

D2 [DEFLECTION DSP]

- D BOARD -



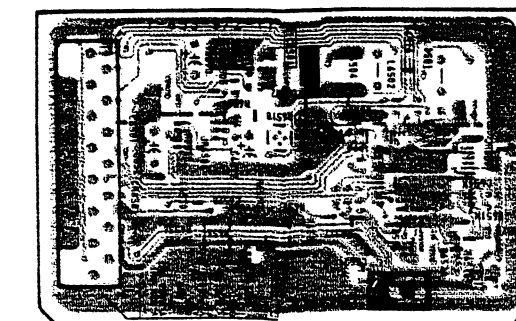
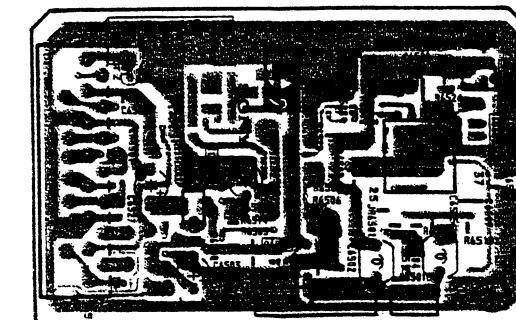
Note :

- : Pattern from the side which enables seeing.
- : Pattern of the rear side.

D BOARD

IC		DIODE	
IC502	G - 7	D501	C - 6
IC507	F - 6	D502	E - 7
IC1551	F - 2	D503	D - 7
IC2501	G - 4	D504	G - 3
IC2502	G - 5	D506	G - 4
IC4601	G - 7	D508	F - 7
IC4602	F - 7	D509	F - 7
TRANSISTOR		D511	G - 4
Q501	F - 7	D512	G - 3
Q502	G - 6	D514	G - 3
Q506	E - 7	D515	F - 6
Q507	G - 4	D516	F - 7
Q508	F - 4	D517	F - 7
Q511	F - 5	D522	C - 4
Q512	B - 7	D524	E - 2
Q514	B - 5		
Q555	G - 3		
Q1551	F - 1		
Q1552	F - 4		
Q2501	G - 5		

- D2 BOARD -



Note :

- : Pattern from the side which enables seeing.
- : Pattern of the rear side.

- : Pattern from the side which enables seeing.
-  : Pattern of the rear side.

① 8 V_{p-p} (V)	② 2.4 V_{p-p} (H)	③ 2.0 V_{p-p} (V)
④ 9.5 V_{p-p} (H)	⑤ 4.2 V_{p-p} (H)	⑥ 3.2 V_{p-p} (V)
⑦ 3.3 V_{p-p} (H)	⑧ 1.3 V_{p-p} (H)	⑨ 24 V_{p-p} (V)
⑩ 1.8 V_{p-p} (V)	⑪ 72 V_{p-p} (H)	⑫ 250 V_{p-p} (H)

Ref. No.	Location	28 INCH	32 INCH	Ref. No.	Location	28 INCH	32 INCH
C2824	B - 7	47 16V	-	R2871	A - 6	39k	-
C2825	B - 7	47 16V	-	R2872	A - 6	10k	-
C2826	B - 7	0.01	-	R2873	A - 6	220	-
C2903	E - 9	0.033 220V	0.022 200V	R2874	B - 6	10k	-
C2922	F - 9	0.0015 630V	0.001 630V	R2875	B - 6	10k	-
				R2876	B - 7	680	-
IC2804	B - 6	uPC358C	-	R2877	B - 7	10k	-
IC2805	B - 7	CA0005AD	-	R2878	B - 7	10k	-
				R2879	B - 7	470 1/2W	-
Q2813	B - 7	2SA1162	-	R2880	B - 8	470 1/2W	-
Q2814	B - 8	2SC2712	-	R2881	B - 8	39k	-
				R2882	C - 7	22k	-
R2841	C - 7	22k	47k	R2933	G - 7	20k	22k
R2852	C - 8	47k	10k	R4815	E - 8	33 3W	39 3W

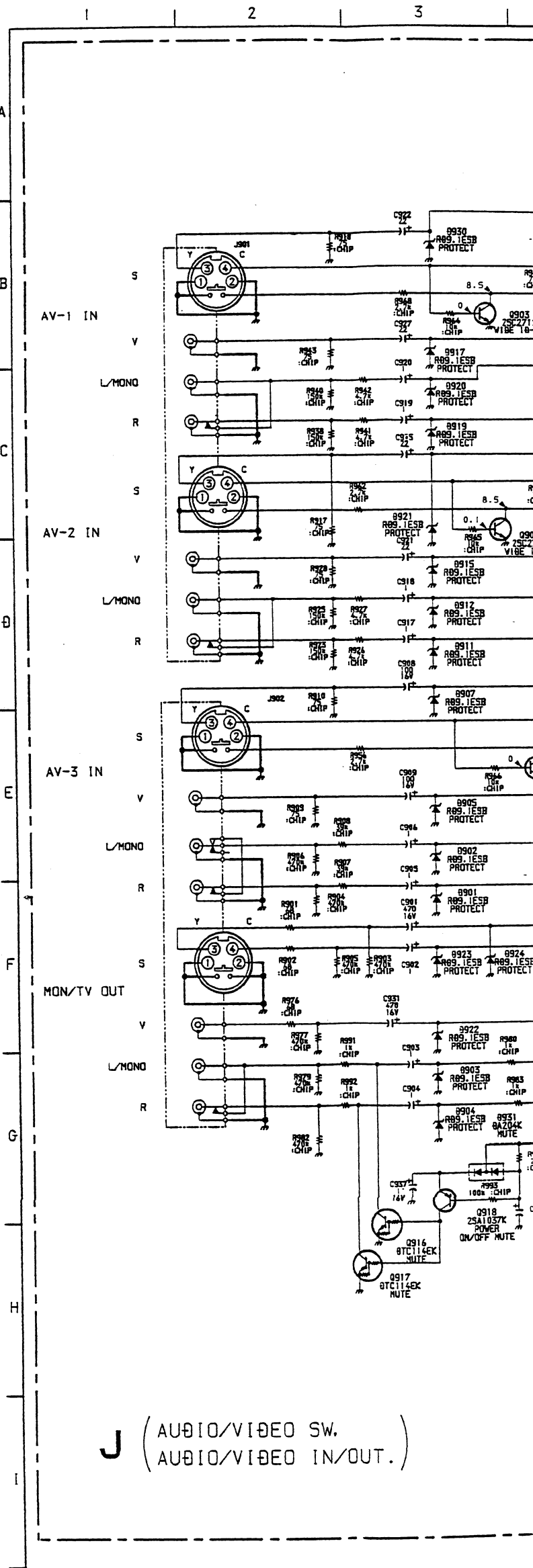
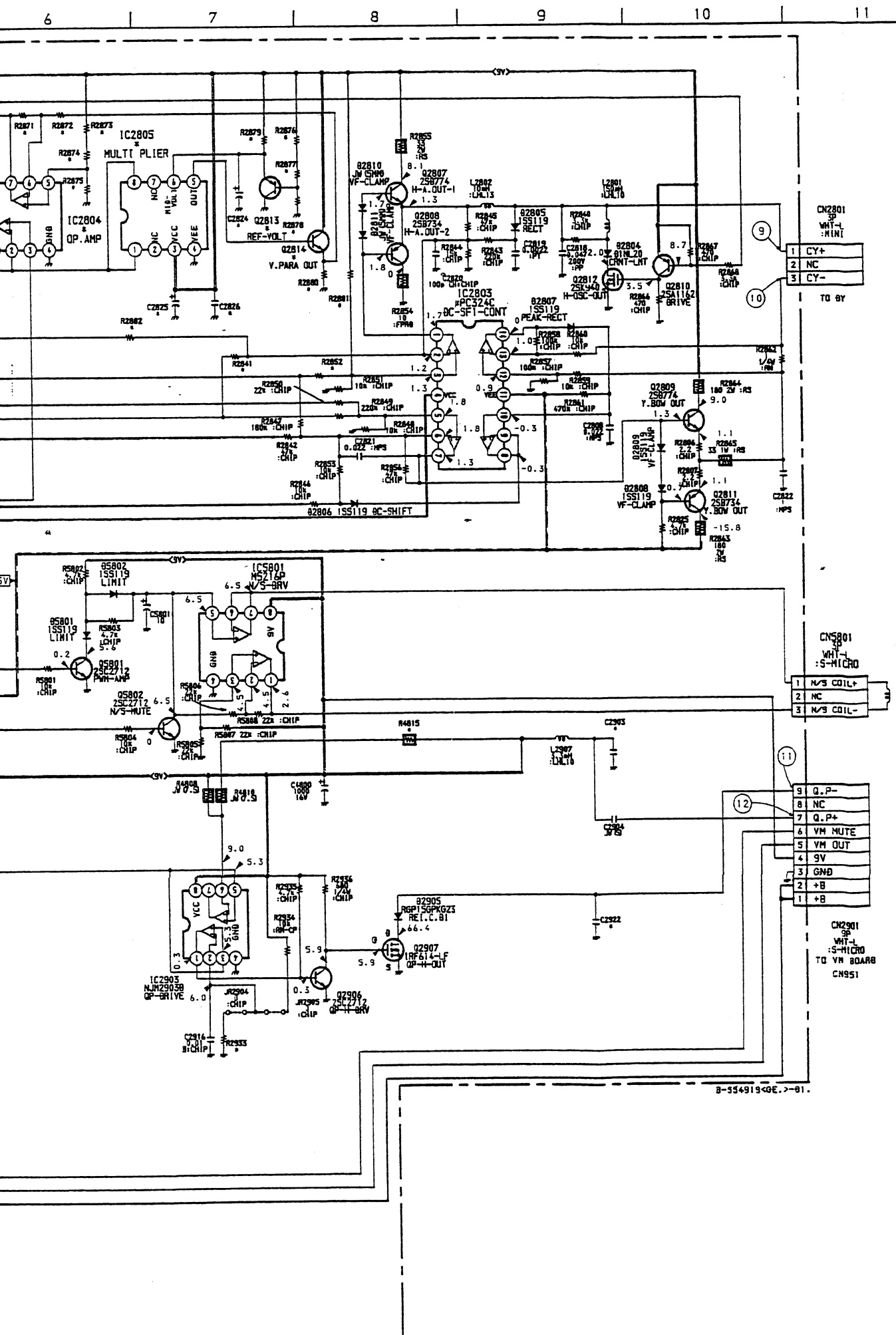
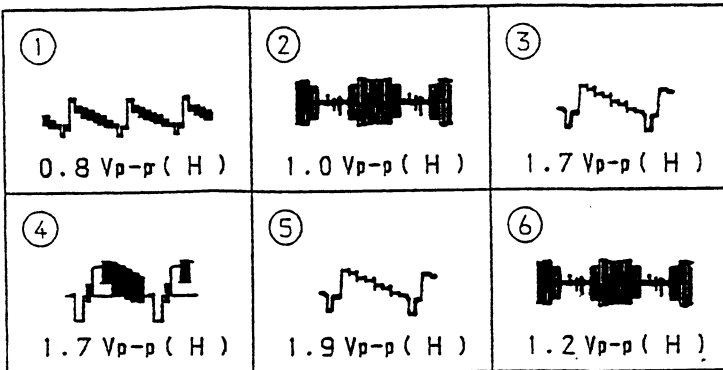
D1

(DYNAMIC CONVERGENCE,
QUADRA POLE, ØF DRIVE,
PICTURE ROTATION.

Ref. No.	Location	28 INCH	32 INCH
R2871	A-6	39k	-
R2872	A-6	10k	-
R2873	A-6	220	-
R2874	B-6	10k	-
R2875	B-6	10k	-
R2876	B-7	680	-
R2877	B-7	10k	-
R2878	B-7	10k	-
R2879	B-7	470 1/2W	-
R2880	B-8	470 1/2W	-
R2881	B-8	39k	-
R2882	C-7	22k	-
R2933	G-7	20k	22k
R4815	E-8	33 3W	39 3W

○: TO BE MOUNT
 -: NOT MOUNT

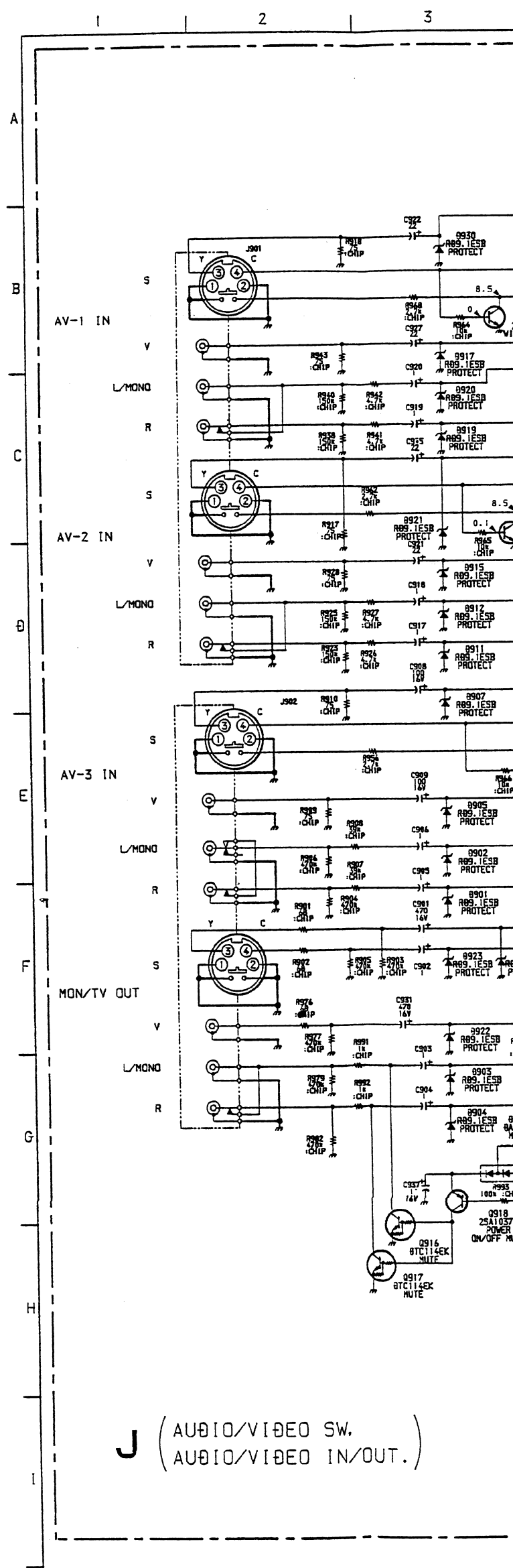
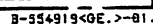
J BOARD WAVEFORMS



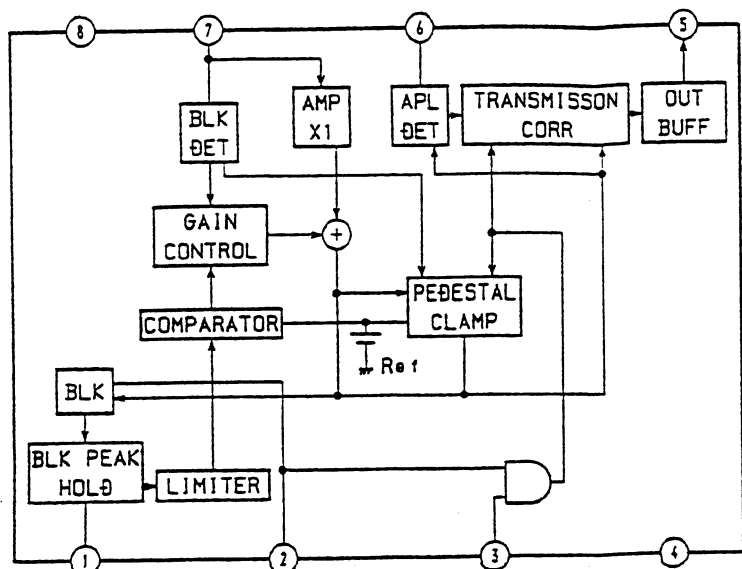
J (AUDIO/VIDEO SW.
 AUDIO/VIDEO IN/OUT.)

○:TO BE MOUNT
-:NOT MOUNT

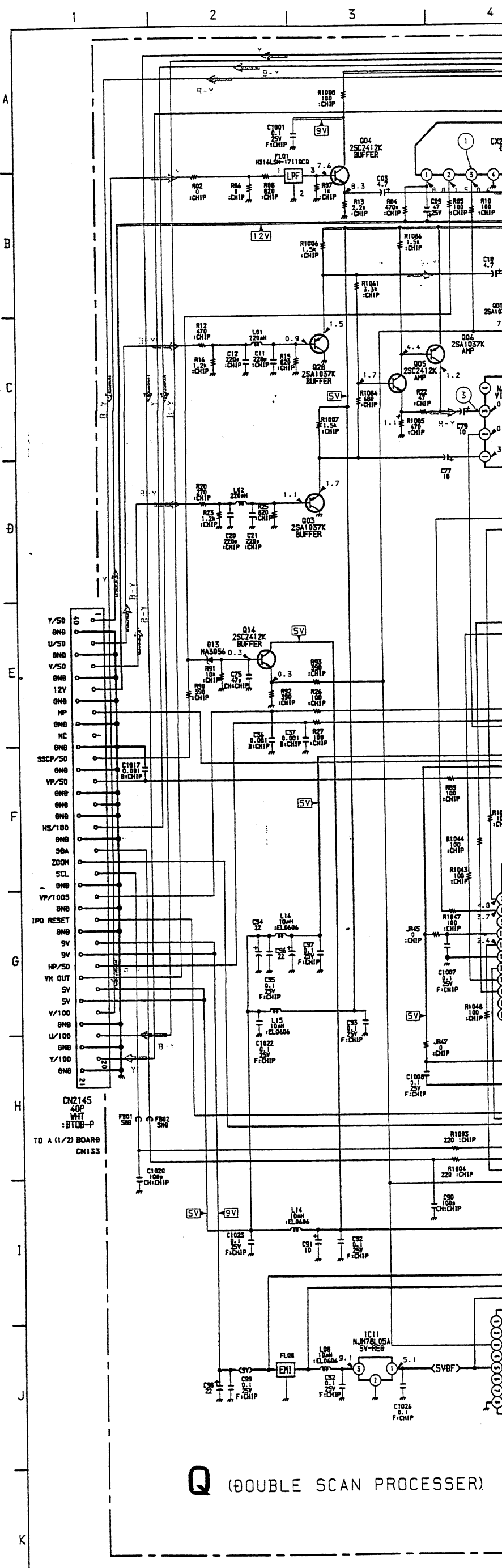
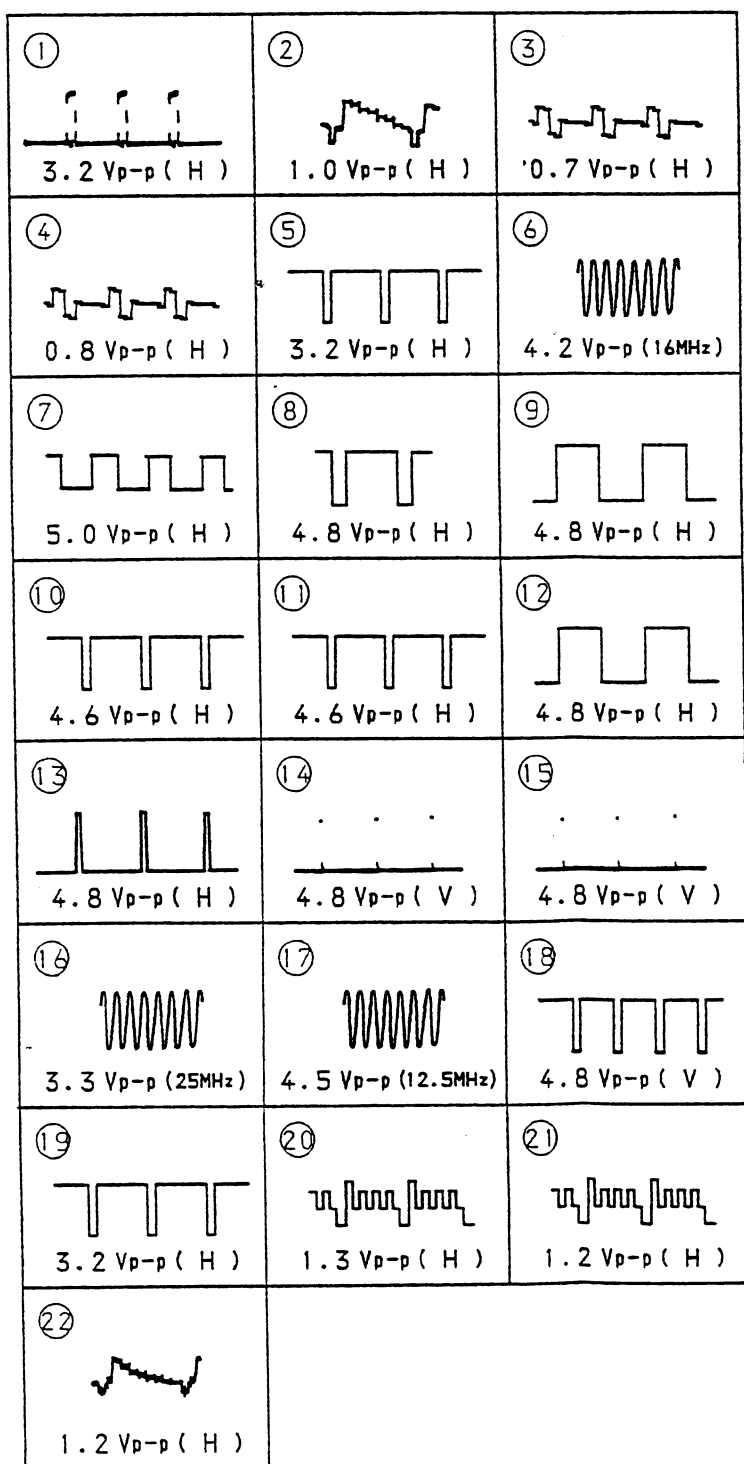
① 0.8 V_{p-p} (H)	② 1.0 V_{p-p} (H)	③ 1.7 V_{p-p} (H)
④ 1.7 V_{p-p} (H)	⑤ 1.9 V_{p-p} (H)	⑥ 1.2 V_{p-p} (H)



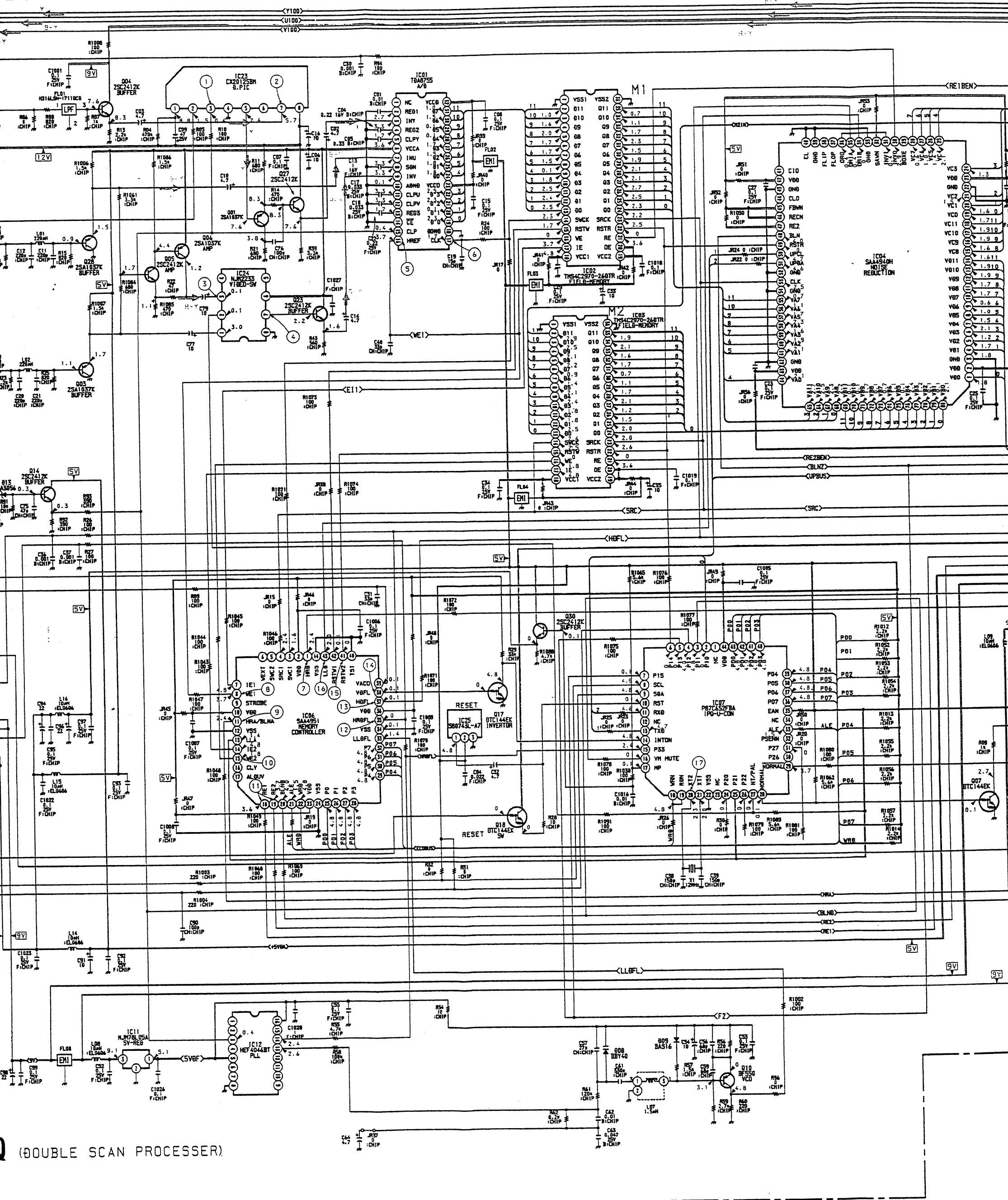
Q BOARD IC23 CX20125BM



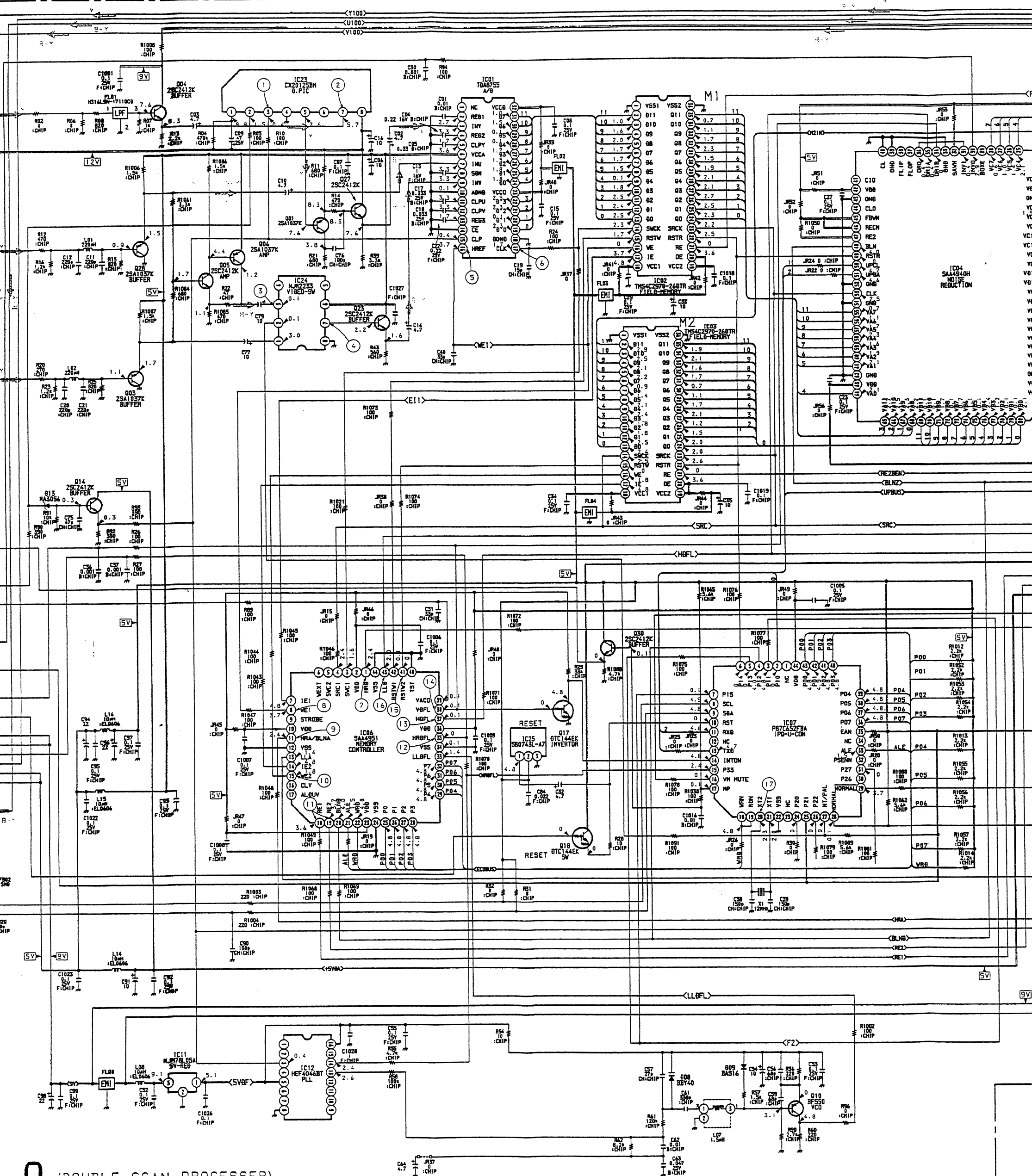
• Q BOARD WAVEFORMS



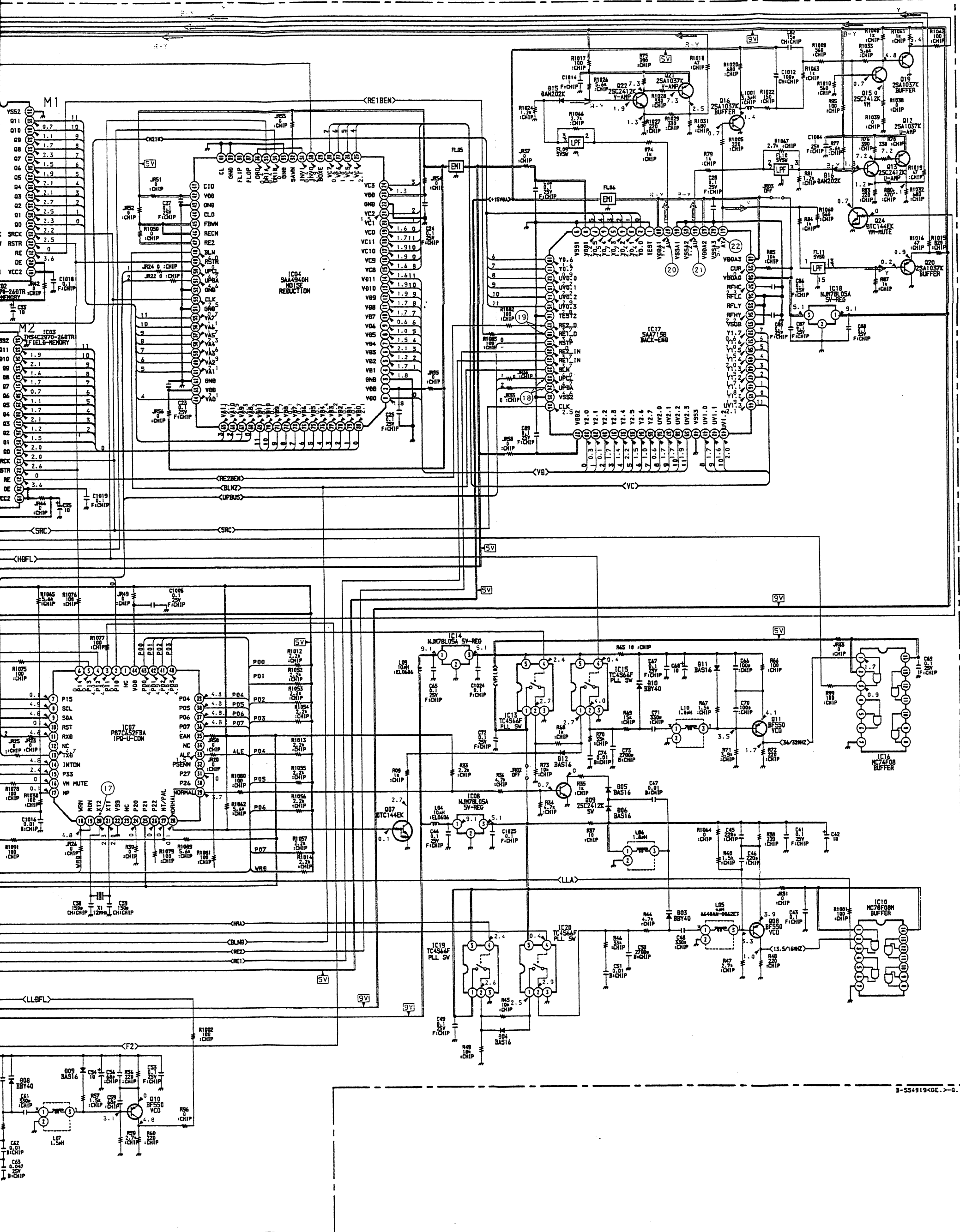
Q (DOUBLE SCAN PROCESSOR)

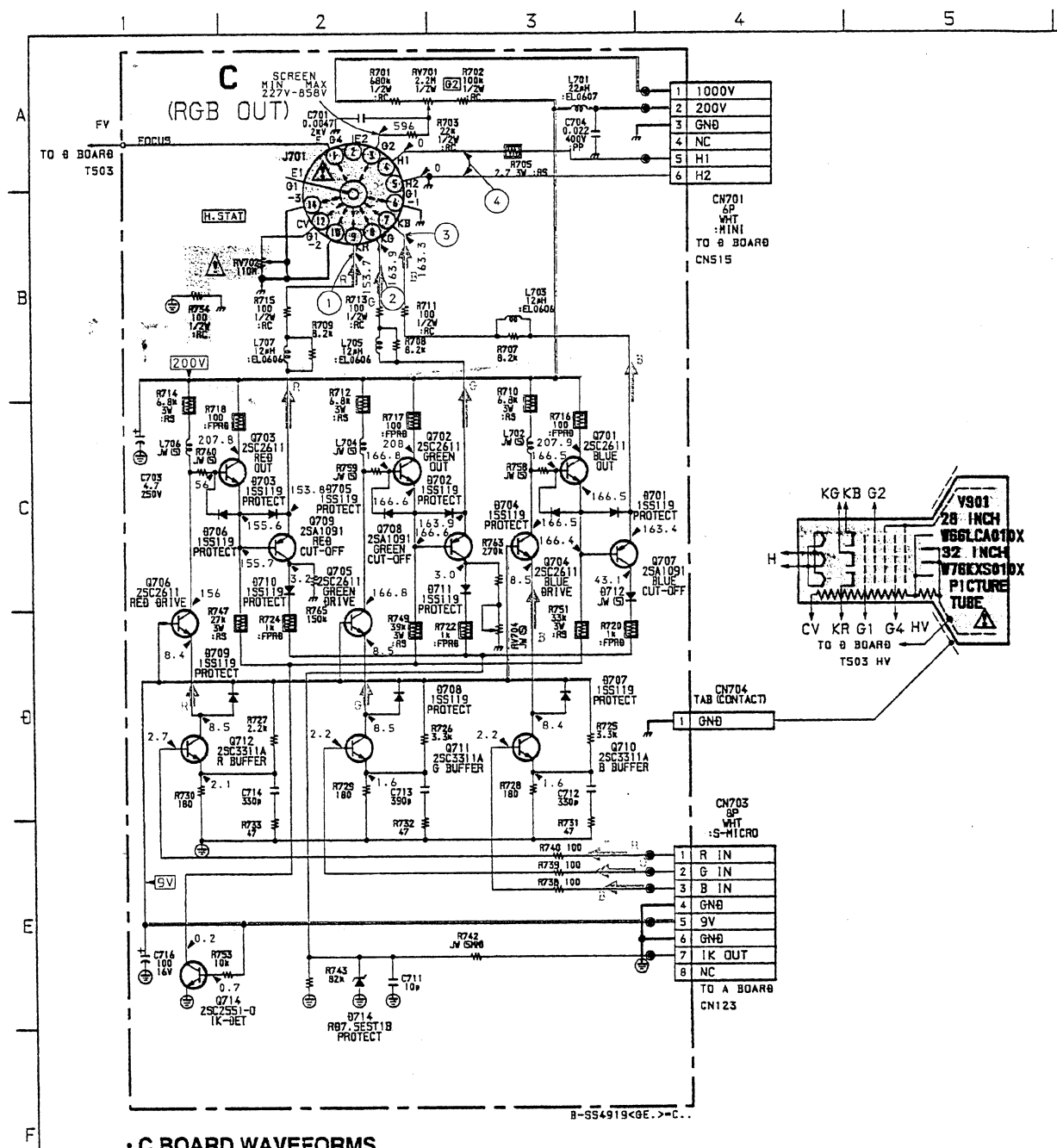


(DOUBLE SCAN PROCESSOR)

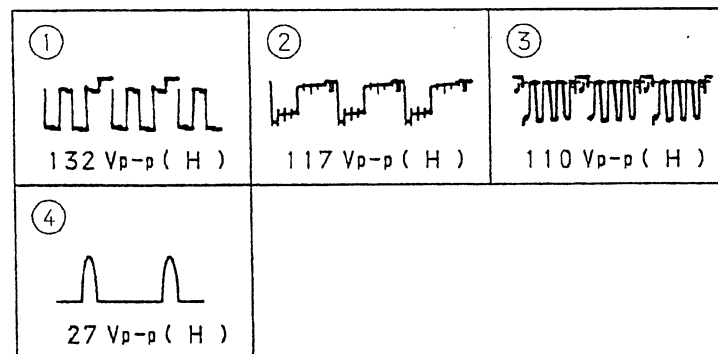


Q (DOUBLE SCAN PROCESSOR).



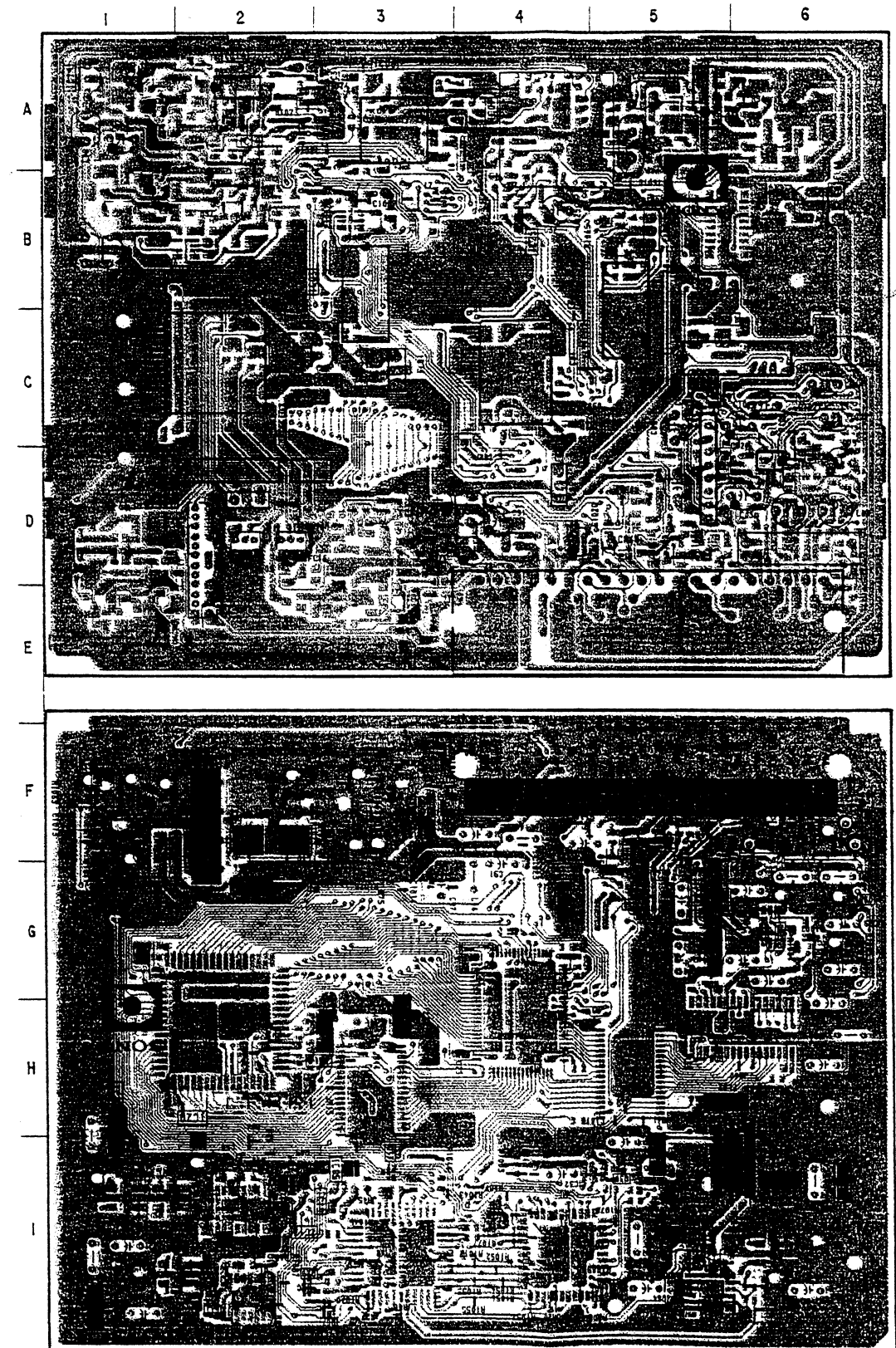


• C BOARD WAVEFORMS



Q [DOUBLE SCAN
PROCESSOR] **C** [R. G. B OUT]

— Q BOARD —



Q BOARD

IC

IC01	C-5
IC02	C-5
IC03	B-3
IC04	C-4
IC06	A-3
IC07	A-4
IC08	B-1, H-1
IC11	B-6, I-6
IC12	I-5
IC13	I-2
IC14	A-1, I-1
IC15	I-2
IC16	A-2
IC17	C-2
IC18	C-3, H-3
IC19	I-2
IC20	I-2
IC23	D-5, G-5
IC24	D-6
IC25	B-4

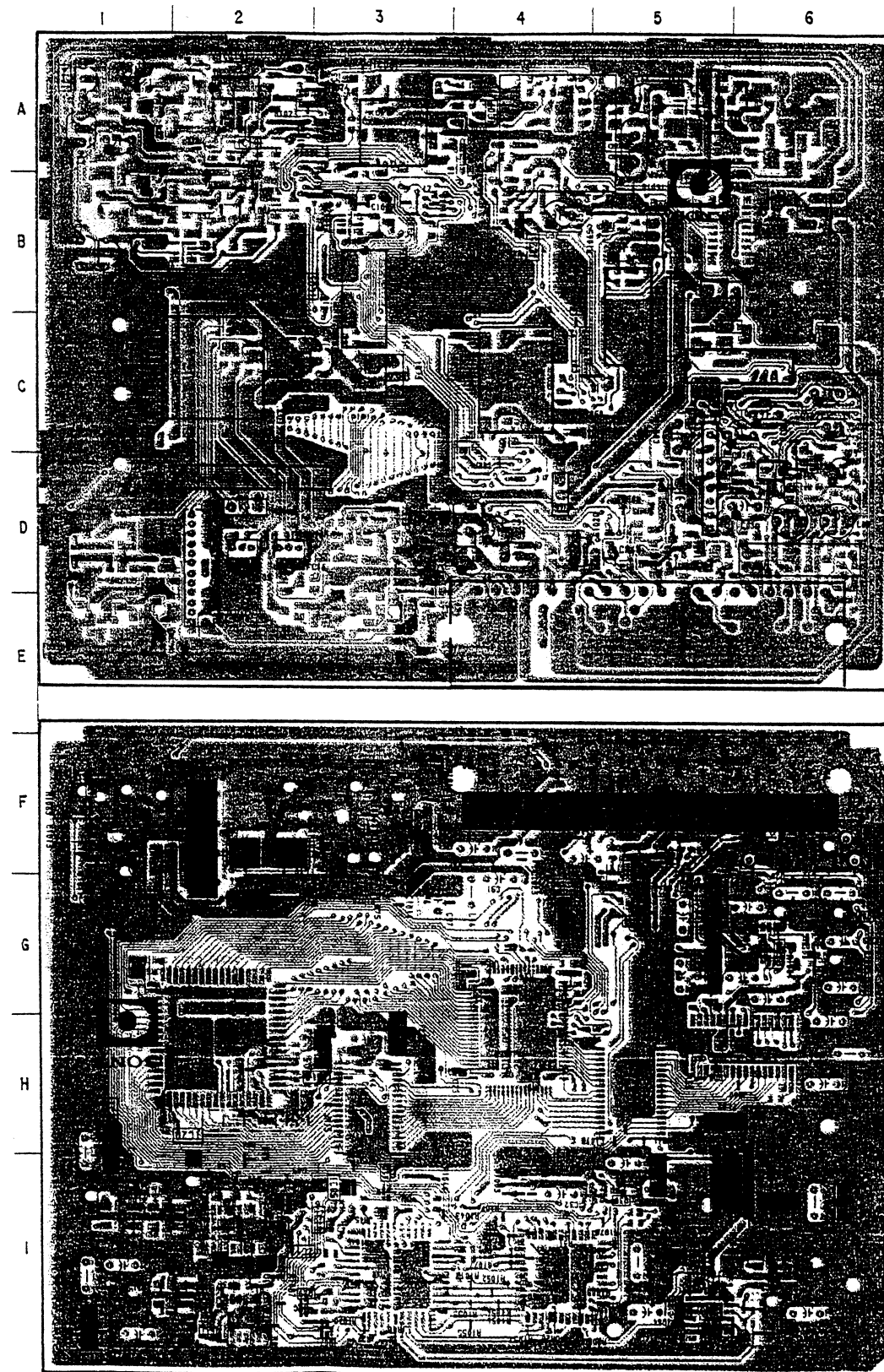
TRANSISTOR

Q01	G-5
Q03	G-6
Q04	F-6
Q05	G-6
Q06	G-6
Q07	I-3
Q08	I-2
Q09	I-2

Note:

- Pattern from the
- Pattern of the re

- Q BOARD -



Q BOARD

IC			
IC01	C-5	Q10	I-6
IC02	C-5	Q11	I-2
IC03	B-3	Q12	F-3
IC04	C-4	Q13	F-3
IC06	A-3	Q14	F-5
IC07	A-4	Q15	F-1
IC08	B-1, H-1	Q16	G-1
IC11	B-6, I-6	Q17	I-3
IC12	I-5	Q18	G-5
IC13	I-2	Q19	F-1
IC14	A-1, I-1	Q20	F-3
IC15	I-2	Q21	F-3
IC16	A-2	Q22	F-3
IC17	C-2	Q23	D-6
IC18	C-3, H-3	Q24	F-1
IC19	I-2	Q27	G-6
IC20	I-2	Q28	G-6
IC23	D-5, G-5	Q30	I-5
IC24	D-6	DIODE	
IC25	B-4	D03	I-1
TRANSISTOR		D04	I-2
Q01	G-5	D05	I-2
Q03	G-6	D06	I-1
Q04	F-6	D08	I-6
Q05	G-6	D09	I-5
Q06	G-6	D10	I-2
Q07	I-3	D11	I-1
Q08	I-2	D12	I-2
Q09	I-2	D13	F-5
		D15	F-2
		D16	F-2

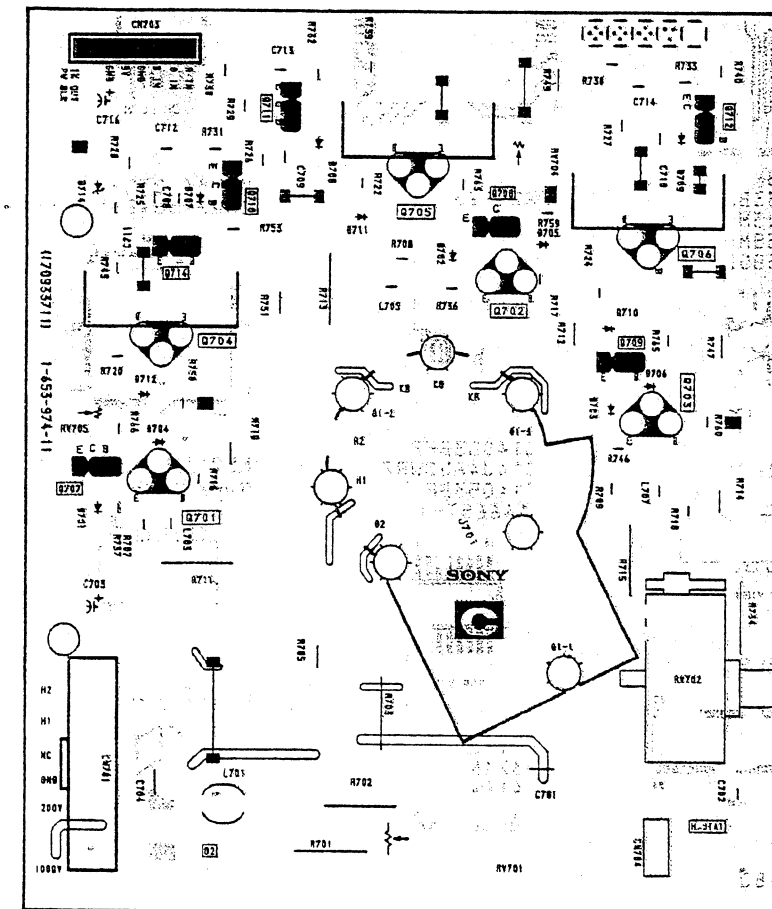
Note :

- : Pattern from the side which enables seeing.
- : Pattern of the rear side.

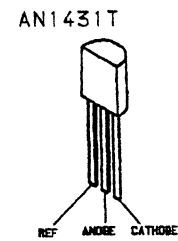
Schematic diagram

← C board

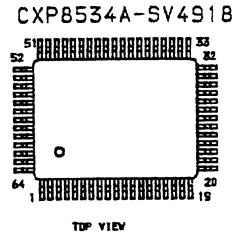
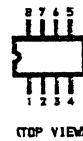
- C BOARD -



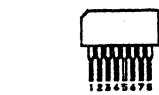
5-4. SEMICONDUCTORS



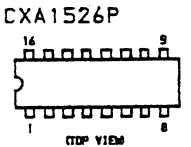
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NJM2903M
NJM4558M-T2
μPC4558G2



CX20125



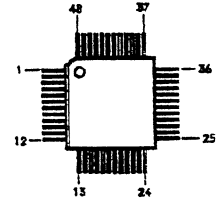
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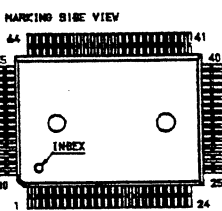
CXA18555



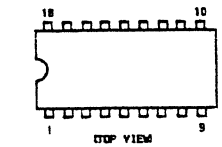
CX02018Q



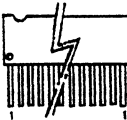
CX02024Q



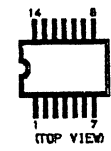
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MC33025P
T0A2579B



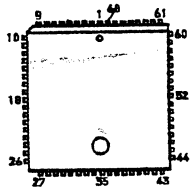
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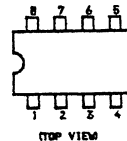
MC74F08M



MSP3410TE-L
SAA7158WP-L



M5216P
NJM29030



NJM78L05A



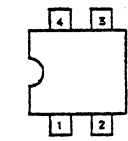
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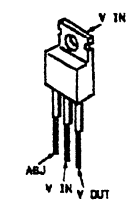
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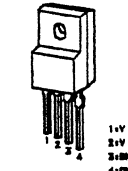
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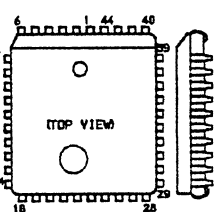
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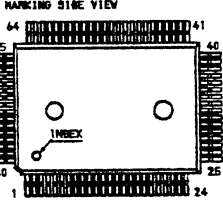
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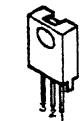
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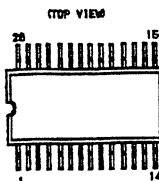
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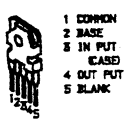
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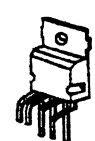
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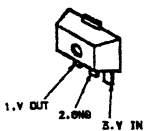
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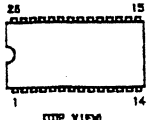
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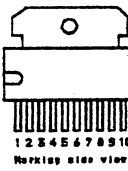
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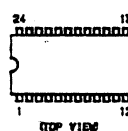
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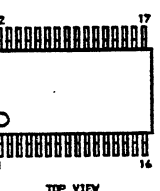
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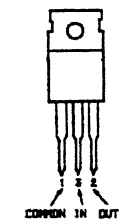
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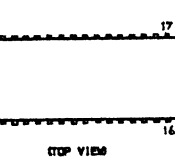
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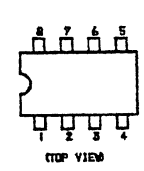
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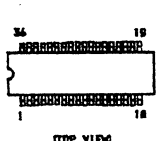
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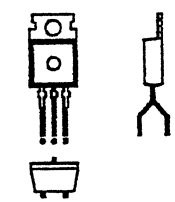
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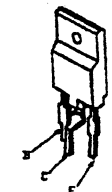
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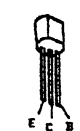
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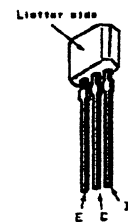
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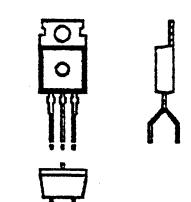
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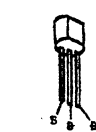
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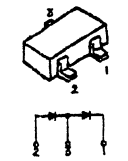
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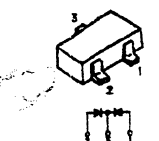
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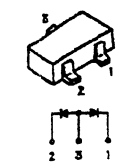
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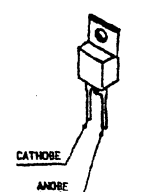
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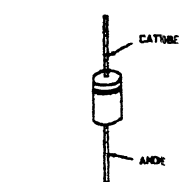
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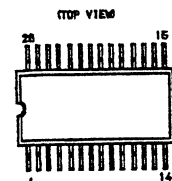


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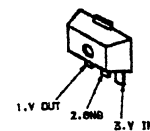
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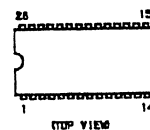
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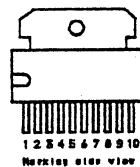
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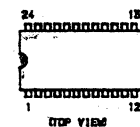
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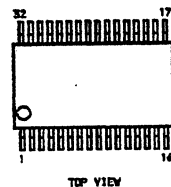
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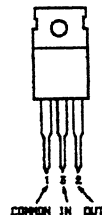
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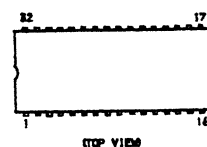
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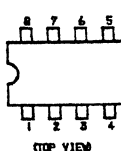
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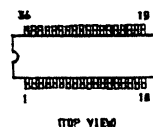
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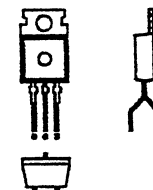
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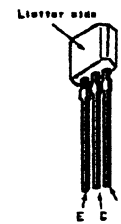
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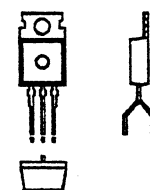
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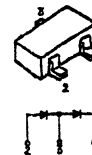
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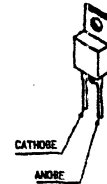
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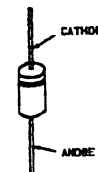
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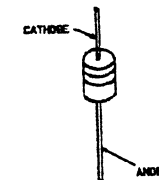
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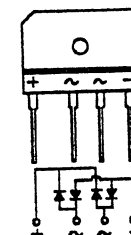
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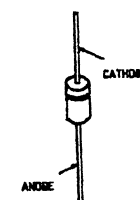
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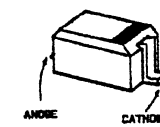
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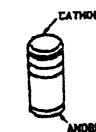
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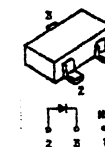
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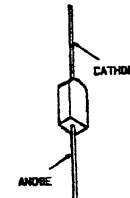
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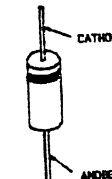
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MA3056
MA3068M
MA3075T
MA3180M-TX
MA3360-M
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R02.0MB
R036M-B
R05.1M-B2
R05.6M-B2
R06.8M-B2



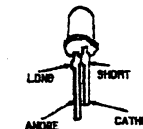
RM11C



Ru-3AM



TF541S (DB102)
SEL1222R-C



SECTION 6 EXPLODED VIEWS

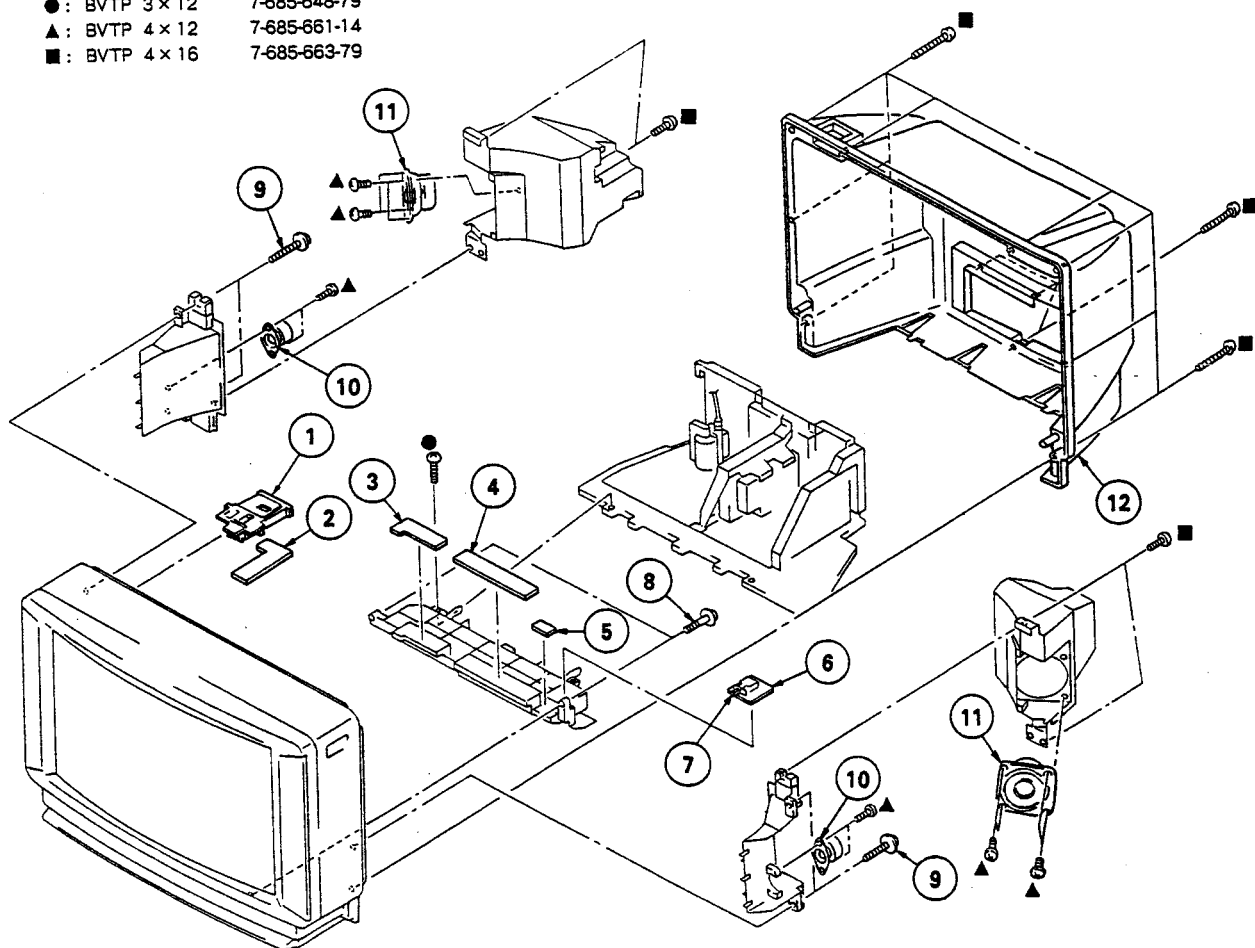
NOTE:

- Items with on part number and on description are not stocked because they are seldom required for routine service.
- The construction parts of an assembled part are indicated with a collation number in the remark column.
- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.

The components identified by shading and mark Δ are critical for safety.
Replace only with part number specified.

6-1. REAR COVER AND SPEAKER (KV-W28MH11 / W28MN11)

- : BVTP 3 × 12 7-685-648-79
 ▲: BVTP 4 × 12 7-685-661-14
 ■: BVTP 4 × 16 7-685-663-79



REF. NO. PART NO. DESCRIPTION

1	X-4032-292-1	BRACKET ASSY. H5
2	*A-1372-075-A	H4 BOARD, COMPLETE (KV-W28MN11/MH11)
3	*A-1372-068-A	H1 BOARD, COMPLETE (KV-W28MN11/MH11)
4	*A-1372-069-A	H2 BOARD, COMPLETE (KV-W28MN11/MH11)
5	*A-1372-067-A	H3 BOARD, COMPLETE (KV-W28MN11/MH11)

REMARK

REF. NO. PART NO. DESCRIPTION

6	*A-1241-173-A	F2 BOARD, COMPLETE
7	~~A-1-571-433-11~~	~~SWITCH, PUSH, (AC POWER)~~
8	4-319-520-11	SCREW, SPECIAL (+PW4X30)
9	4-384-096-01	SCREW (4X16), TAPPING, +P
10	1-504-121-51	SPEAKER (5CM)
11	1-504-771-11	SPEAKER (12CM)
12	4-042-194-21	COVER, REAR

REMARK